TUVALU

National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants

Tuvalu POPs Project

July 2008

Foreword

The twelve chemicals, also known as the “dirty dozen”, scheduled under the Stockholm Convention on Persistent Organic Pollutants (POPs), pose significant and increasing threats to human health and the environment. Tuvalu is a small country, which does not, and has no history of, manufacturing POPs. However due to their chemical nature, including their long range environmental transport, POPs are a global concern. Tuvalu must address risks posed by unintentional and intentionally produced POPs, concurrently with the global community.

Tuvaluans depend on protein from marine biodiversity and on the country’s minute land area for harvesting household crops. Therefore the health and uncontaminated nature of the land area must be protected for household gardens. Because all land-based contamination will eventually reach the sea and further contaminate marine ecosystems, bioaccumulate in the food chain, thereby further impacting the health and livelihoods of Tuvaluans, risks posed by POPs must be addressed.

Tuvalu relies heavily on the international community to assist us to deal with toxic chemicals and their dangers. Tuvalu is committed to complying with all obligations laid down in international agreements and in particular, those in the Stockholm Convention on POPs. Meeting these obligations requires the support of the Tuvaluan Government as well as the invaluable contributions from local experts on their respective sectors.

The National Implementation Plan (NIP) represents the first stepping stone for Tuvalu, in the long path of dealing with POPs and more generally chemicals management. It includes an introduction which outlines the purposes of the NIP, the country background, as well as those involved in the preparation of the NIP and the suggested strategies and proposed work plan to meet Tuvalu’s obligations under the Stockholm Convention.

We sincerely hope that the implementation of these strategies will contribute to better health of Tuvaluan’s. We also acknowledge the inter-linkages between the matters addressed in this NIP, including contaminated sites, and the threats pro posed by climate change and sea level rise, which may spread contamination on the islands and into the ocean and lagoons.

I would like to acknowledge the generous financial support of the Global Environment Facility (GEF) and the technical support from the United Nations Environment Programme (UNEP). Without this support, Tuvalu would not have been in a position to produce report.

Tuvalu strives to achieve sustainable development and it guided by the Kakeega II (National Strategy for Sustainable Development 2005-2015) and the targets set out in the Millennium Development Goals (MDGs). Although the implementation of strategies within the NIP addresses challenges in terms of chemical management specifically, the work also contributes to sustainable development generally through decreasing environmental risks from chemicals. All strategies in this NIP are entirely consistent with Tuvalu’s development objectives.

To achieve these ambitious goals, Tuvalu requires ongoing financial and technical support from the international community. Tuvalu remains committed to joining hand-in-hand with its neighbours to support regional initiatives for a safer environment for its future generations.

Tuvalu mo te Atua

Honourable Tavau Teii
Deputy Prime Minister and Minister for Natural Resources and Environment

Executive Summary

The National Implementation Plan (NIP) for the Stockholm Convention for Tuvalu consists of four main sections; 1. Introduction; 2. Country Background and 3. Suggested Strategies and Action Plans. These sections are followed by Annexes 1 to 5 and References.

1. Introduction provides background information regarding the Stockholm Convention, what the Convention is about, Tuvalu's relationship to the Convention and describes in brief the chemicals regarded, at present, as POPs. The chapter also describes the structure of the NIP and the purpose for which it was produced. It describes various GOT Ministries and Departments, public corporations, private sector firms and non-government organizations involved in the preparation of the NIP.

2. Country Background describes the existing background in Tuvalu against which the NIP is being formulated and the setting in which it is to be implemented. It describes Tuvalu's location, land area and other associated physical features, typical land formation, a brief history of the nation, its demographic features and political background. It describes the assessment of POPs in Tuvalu and also outlines the various departments deemed to be essential for the implementation of the implementation of the NIP. However, while many of the departments so described are members of the NCC, their mandates as budgeted do not relate to POPs.

3. Suggested Strategies and Proposed Work Plan of the National Implementation Plan describes proposed action plans necessary to the implementation of the Convention in Tuvalu. This Proposed National Implementation Plan is based around a number of specific action plans, which are outlined in section 3.2. The goals and objectives of each suggested action plan reflect the requirements of the Stockholm Convention that are considered to be relevant to Tuvalu. These suggestions have been reviewed and approved by the NCC. It should also be noted that the proposed suggested actions plans do not include all possible action plans dictated by individual articles or implied by the Convention. In this proposal, there are seven (7) and are as follows:

1. Strategy for National Coordination, management, reporting (Article 15), information exchange (Article 9) and public information, awareness and education (Article 10);
2. Strategy for Capacity Building;
3. Strategy for the Reduction and Elimination of Intentional Releases of POPs Pesticides (Annex A, Part I, POPs and other pesticides (Article 3);
4. Strategy for the Reduction and Elimination of Intentional Releases of POPs (PCBs) (Annex A, Part II, PCBs (Article 3))
5. Strategy for the Reduction and Elimination of Unintentional Releases of POPs (Dioxins and Furans, Article 5)
6. Strategy for elimination of releases from stockpiles and wastes
7. Strategy for Research, Development and Monitoring

Much of the work in these suggested action plans is intended to be carried out by GOT personnel and Tuvalu citizens with assistance from regional and international experts as and when required. This approach is intended to assist in developing local capacity for POPs management and implementation of the Convention along the intentions of the number two (2) suggested action plan of capacity building. The specific proposals for capacity building are as listed in Annex 3.

The suggested timetable for implementation of these plans is also included in a detailed matrix of suggested activities given in Annex 3. Subject to the approval of the NCC, most of the activities are intended to be carried out over the next three to five years, although some involve on-going commitments, which will continue on for many years into the future.

Background

As of January 2007, this document presents a proposed national plan for the implementation of the Stockholm Convention on Persistent Organic Pollutants in Tuvalu. Tuvalu acceded to the Stockholm Convention on 19 January 2004 and the Convention entered into force on 17 May 2004.

The objective of the Stockholm Convention is to protect human health and the environment from persistent organic pollutants (POPs). The convention currently covers the following twelve chemicals: aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, toxaphene, hexachlorobenzene (HCB), polychlorinated biphenyls (PCBs), polychlorinated dibenzo-*p*-dioxins, and polychlorinated dibenzofurans. The first nine of these are pesticides. HCB is also classed as an industrial chemical along with PCBs. Dioxins and furans are formed as unintentional by-products in combustion processes and some industrial activities. HCB and PCBs are also sometimes unintentionally produced in combustion systems so they are sometimes classed as unintentionally produced POPs. All these chemicals are to be controlled through various actions, including prohibiting future production and use of most of the pesticides and industrial chemicals, and the application of a range of measures for the reduction of releases of unintentional POPs.

Preparation of the Proposed National Implementation Plan

This proposed plan was developed by the POPs Project Coordinating Unit (PCU) with the assistance of two local consultants. The two local consultants and the PCU were assisted by an international consultant from the Secretariat of the Pacific Regional Environment Programme (SPREP), who reviewed the document as its preparation progressed and gave advice on how to proceed. This proposed plan has used the format developed by the UNEP and the World Bank in their document "*Guidance on Planning and Developing National Implementation Plans under the Stockholm Convention*" and has adapted the draft NIP of the Fiji Islands (by Dr. Graham Bruce) for the particular situation of Tuvalu.

The POPs Project in Tuvalu activities broadly aimed at creating sustainable capacity and ownership in Tuvalu in relation to the Stockholm Convention, including preparation of a National Implementation Plan. The work of the POPs Project, including the preparation of this proposed National Implementation Plan, was guided by the National Coordinating Committee (NCC); a stakeholder body chaired by the Secretary to Government, and included representation from the government, government corporations, non-governmental organisations and the private sector. Consultation with stakeholders was deemed an important element in the preparation of the National Implementation Plan, so as to reflect national ownership of the plan.

Persistent Organic Pollutants in Tuvalu

The current situation regarding persistent organic pollutants in Tuvalu is summarised in Chapter 2 along with a more general Country Profile. The key issues relating to POPs chemicals and implementation of the Convention are as follows:

<u>POPs Pesticides</u>

There is no evidence of any current trade by Tuvalu in POPs pesticides. The POPs pesticides HCB, chlordane, dieldrin and DDT were previously approved for use in Tuvalu but these registrations were withdrawn some years ago. There are new and obsolete pesticides in storage by the Department of Agriculture, none of these are POPs.

Recent surveys for Enabling Activities of the POPs Project in December 2005 of pesticide users, especially the Department of Agriculture, indicate a need for improved recording, monitoring and enforcement of the current controls over pesticides. This would include capacity building for the Department of Customs (DC) for better enforcement of import restrictions and detection of illegal imports. The Department of Agriculture, in its role prescribed by the Pesticides Act, is strengthened to record and catalogue the names of the chemicals and their quantities imported as well as the names of suppliers and importers. This function however has been discontinued in recent years but it should be re-established.

Polychlorinated biphenyls (PCBs)

PCBs were used in the past in Tuvalu as transformer oils. Field-testing carried out by an AusAID/SPREP (POPs in PICs) sponsored team in 1998 and again in 2002 found oil-containing PCBs in one transformer at the TEC. These PCB containing oils have were shipped to Australia for destruction. No specific regulatory actions have been taken in Tuvalu at present for the removal and disposal of obsolete electrical equipment containing PCBs, such as the capacitors used in fluorescent lighting ballasts.

Unintentional POPs (Dioxins and Furans)

The major releases of dioxins and furans to air are believed to be from waste incineration (including medical wastes), power generation and the burning of wood for cooking. Domestic rubbish burning and shrub clearing may also be significant contributors, while landfills may be a significant reservoir source.

Again there are currently no regulatory controls on the release of dioxins and furans in Tuvalu, although the potential now exists for these controls to be introduced under a proposed Environment Act. For such mechanisms to exist, however, depends on the will of GOT, and in particular, the Department of Environment (DE), to insistently continue supporting initiatives regarding regulatory mechanisms to become adopted legal instruments. The potential also now exists for these POPs chemicals to be addressed as a result of the current level of public awareness due to POPs Project activities.

Stockpiles and Contaminated Sites

There are small stockpiles of obsolete and unwanted chemicals in Tuvalu, including a small suspected amount of POPs, mainly in outer atolls that were not covered by the POPs in PICs project. Most of the stockpiles are being stored under relatively unsafe conditions, awaiting action on disposal. Currently, there are no initiatives in place to address these wastes. There are also obsolete chemicals, some in the form of tablets, in the Princess Margaret Hospital's pharmacy department. These are stored in relatively safe conditions.
The POPs Project, during the implementation of activities on the outer-islands, concluded that the issue of contaminated sites from previous agricultural applications of pesticides, buried heavy construction equipments, as well as remains of WWII equipments and oil drums, is of major concern to island elders. However, the project also concluded that the extent of the problem, if there is indeed one, is yet to be fully determined at the time of preparing this proposed plan.

Public Awareness, Information and Education

While the POPs Project has conducted activities regarding public awareness, dissemination of information to the public and educating the general population on matters pertaining to POPs, the PCU, at the time of this proposal, feels that there is a need to take these activities further as some of the activities that were supposed to be conducted during the course of the project, were not carried out because of the shortage of time available. Thus there is still very limited awareness by the public about POPs. This was also clearly revealed in surveys carried out by the POPs Project as part of the project activities. The limited awareness of the public about POPs is also shared by the majority of GOT officials. Among GOT officials, awareness of POPs is limited to those who were involved in the 1998 AusAID/SPREP PTS project and those with tertiary qualifications related to the environment currently employed in the Department of Environment.

The POPs Project commenced in April 2005 and the issue of chemical management and the effect of chemicals on the environment and humans became an issue soon after the establishment of the project. The POPs Project Enabling Activity surveys of chemical awareness in Tuvalu showed that there are significant concerns about practices for chemical storage, handling, use, and disposal both at work and in homes and there is also clear evidence of the need for improving the current knowledge and understanding of personnel in GOT's key agencies including the Department of Education, regarding curriculum development, about chemicals and POPs in particular.

Research, Development and Monitoring

The technical infrastructure for POPs monitoring and research in Tuvalu is non-existent. Tuvalu does not have any laboratory that is specifically set up to carry out sophisticated chemical analysis to determine the constituents of environmental samples. The POPs Project, in conducting its enabling activities, had referred samples requiring analysis to the Institute of Applied Science at the University of the South Pacific, in Suva, Fiji. The Princess Margaret Hospital also refers their samples requiring analysis to this institution. As of August 2006, the PCU pointed out that USP no longer provide this service. This requires further confirmation and other institutions identified.

Reporting

Currently the National Focal Point and the Department of the Environment, with the assistance of the POPs Project Coordinating Unit (PCU), is submitting reports to the UNEP on the expenses the project is incurring and the tasks it is doing. These reports are provided on a quarterly basis. The reporting required by the Convention under Article 15 is not the same as the current reporting. Reporting under Article 15 requires countries to report to the Conference of Parties (COP) on the measures they have taken to implement the POPs Convention. The COP will provide guidance on reporting.

List of Abbreviations

AMO	Aid Management Office, MF.
BP	British Petroleum South Pacific Limited
AusAID	Australian Agency for International Development
BAT/BEP	best available techniques/ best environmental practices
BHC	benzene hexachloride
CAS	Chemical Abstracts Service
CFCs	chlorofluorocarbons
CD	Curative Division, PMH
CSD	Commission for Sustainable Development
DA	Department of Agriculture
DC	Department of Customs
DCA	Department of Community Affairs
DDT	1,1,1-trichloro-2,2-bis (4-chlorophenyl) ethane
DE	Department of Environment
DEd	Department of Education
DF	Department of Fisheries
DFA	Department of Foreign Affairs
DL	Department of Labour
DLS	Department of Lands and Survey
DMPS	Department of Marine and Port Services
DoE	Department of Energy
DPT	Department of Personnel and Training
DRD	Department of Rural Development
DS	Department of Sports
DoS	Department of Statistics
DT	Department of Tourism
DTI	Department of Trade and Investment
DWD	Department of Women Development
EIA	Environmental Impact Assessment
ERDP	Economic, Research and Policy Division
FAO	Food and Agriculture Organization of the United Nations
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	geographic information systems
GOT	Government of Tuvalu
IE/PAC	Industry and Environment Programme Activity Centre
IFCS	Intergovernmental Forum on Chemical Safety
ILO	International Labour Organization
IMO	International Maritime Organisation
IOMC	Inter-Organization Programme for the Sound Management of Chemicals
IPCS	International Programme on Chemical Safety
IRPTC	International Register of Potentially Toxic Chemicals
ISG	Inter-sessional Group of the Intergovernmental Forum on Chemical Safety
ISO	International Organization for Standardization
ME	Ministry of Education
MCT	Ministry of Communication and Transport
MEA	Multi-lateral environment agreement
MF	Ministry of Finance
MH	Ministry of Health
MLNR	Ministry of Lands and Natural Resources
MSDS	Material Safety Data Sheets
MTC	Ministry of Transport and Communication
MWE	Ministry of Works and Energy
NBSAP	National Biodiversity Strategies Action Plan
NCC	National Coordinating Committee
NGOs	Non-Governmental Organizations
OAG	Office of the Attorney General
OECD	Organization for Economic Co-operation and Development
OPM	Office of the Prime Minister
PCBs	polychlorinated biphenyls
PD	Preventative Division [administers the Public Health Act]
PCDDs	polychlorinated dibenzo-p-dioxins
PIC	prior informed consent
PICs	Pacific Island Countries
PMH	Princess Margaret Hospital
POPs	Persistent Organic Pollutants
PWD	Public Works Department
SAICM	Strategic Approaches to International Chemical Management
SITC	Standard International Trade Classifications
SOPAC	South Pacific Applied Geoscience Commission
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
TANGO	Tuvalu Association of Non-Government Organization
TCS	Tuvalu Cooperative Society Ltd
TEC	Tuvalu Electricity Corporation
TNCW	Tuvalu National Council of Women
UNCED	United Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
USP	University of the South Pacific
WHO	World Health Organization
WTO	World Trade Organization

Table of Contents

1. Introduction

1.1 The Stockholm Convention on Persistent Organic Pollutants

This document presents the National Plan for the Implementation of the Stockholm Convention on Persistent Organic Pollutants in Tuvalu. Tuvalu acceded to the Stockholm Convention on the 19th January 2004 and the Convention entered into force on 17 May 2004.

The objective of the Stockholm Convention is to protect human health and the environment from persistent organic pollutants (POPs). The term POPs refers to a group of chemicals having the specific characteristics of high toxicity, persistence and mobility, and the potential for bioaccumulation. The convention currently covers twelve chemicals, although there is provision for others to be added in future. The current list of POPs is as follows: aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, toxaphene, hexachlorobenzene (HCB), polychlorinated biphenyls (PCBs), polychlorinated dibenzo-*p*-dioxins (PCDD), and polychlorinated dibenzofurans (PCDF).

The first nine of these chemicals are pesticides. HCB (the 9th pesticide in the list) is also classed as an industrial chemical along with PCBs. Dioxins and furans[1] are formed as unintentional by-products in combustion processes and some industrial activities. HCB and PCBs can also be formed in this way. Further information on the properties and uses of these chemicals and their potential health and environmental effects is summarised in Annex 1.

The chemicals covered under the Convention are to be controlled through various actions, including prohibiting future production and use of most of the pesticides and industrial chemicals, and the application of a range of measures for the reduction and where feasible elimination of the releases of unintentional POPs. A summary of Tuvalu's key obligations under the Convention is given in sub-section 1.2 below.

1.2 Purpose and Structure of the Implementation Plan

Article 7 of the Convention requires that:

"1. Each Party shall:

(a) Develop and attempt to implement a plan for the implementation of its obligations under this Convention

(b) Transmit its implementation plan to the Conference of the Parties within two years of the date on which this Convention enters into force for it: and

(c) Review and update, as appropriate, its implementation plan on a periodic basis and in a manner to be specified by a decision of the Conference of the Parties".

The preparation of the NIP is based on obligations of Tuvalu to the Stockholm Convention. These major obligations are as follows;

1. Prohibit and/or take legal and administrative action necessary to eliminate production and use of Annex A chemicals (aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene and PCBs) – Article 3.1(a);
2. Restrict production and use of Annex B Chemicals (DDT) - Article 3.1(b);
3. Ensure that chemicals listed in Annex A or Annex B are imported only for the purpose of environmentally sound disposal or for a use permitted for the Party under either annex – Article 3.2(a);
4. Ensure that chemicals listed in Annex A or Annex B are exported only for the purpose of environmentally sound disposal, to a Party that has a permitted use of the chemical under either of the annexes or to a non-Party that certifies that it is committed to comply with certain provisions of the Stockholm Convention – Article 3.2(b);
5. Take measures under existing regulatory and assessment schemes to prevent the production and use of new pesticides and industrial chemicals

[1] The term dioxins and furans is used throughout this document to describe the two classes of chemicals which are more correctly referred to as polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs).

exhibiting the characteristics of POPs and take the criteria for identification of POPs into consideration in such schemes - Article 3.3, Article 3.4;

6. Register specific exemptions to Annex A or Annex B if needed and upon becoming a Party and, if an extension to such a registration is to be requested, provide a suitable justification report for the extension - Article 4.3, Article 4.6;
7. Develop and implement an action plan on a national, sub-regional or regional basis, as appropriate, for the reduction of total releases of Annex C chemicals (PCDD, PCDF, HCB, PCB) from anthropogenic sources within two years of becoming a Party – Article 5;
8. Manage POPs stockpiles and wastes in a manner protective of human health and the environment including developing strategies for their identification, and application of environmentally sound handling, collection, transport and disposal measures - Article 6.1;
9. Develop appropriate strategies for identifying sites contaminated by POPs chemicals – Article 6.1(e);
10. Prohibit disposal of POPs stockpiles and wastes involving or leading to recovery, recycling, reclamation, direct use or alternative use - Article 6.1 (d) (iii);
11. Regulate transboundary movement of POPs stockpiles and waste POPs in accordance with international rules, standards and guidelines- Article 6.1 (d) (iv);
12. Submit a national implementation plan to the Conference of the Parties within two years of becoming a Party and review the plan on a periodic basis - Article 7.1;
13. Designate a national focal point for exchange of information on POPs - Article 9;
14. Exchange information with other Parties related to reduction or elimination of production, use and release of POPs and alternatives to POPs - Article 9;
15. Provide the public with access to current information on POPs including information relating to health and safety of humans and the environment - Article 10.2;
16. Provide financial support and incentives for national activities intended to achieve objectives of the Convention - Article 13.1;and
17. Provide periodic reports to the Secretariat on implementation of the Convention's provisions including statistical data on import and export of Annex A and Annex B chemicals - Article 15.1, Article 15.2**.**

The above 17 main obligations can be summarised as requiring Parties to develop strategies, measures, and action plans to address specific issues, namely:

- The reduction or elimination of releases from intentional production and use of POPs (Article 3 and 4, Annexes A and B);
- Reduction and elimination of the unintentional production of POPs (Article 5 and Annex C Parts I, II and III);
- The reduction or elimination of releases from stockpiles and wastes (Article 6); and
- Measures related to information exchange (Article 9), public information, awareness and education (Article 10), research, development and monitoring (Articles 11) and reporting (Article 15).

In order to satisfy these obligations, seven (7) strategies have been developed to address these requirements, and these form the main body of the Implementation Plan, as presented in Section 3. Of critical importance are the plans developed to strengthen the national infrastructure and systems in managing chemicals in the country (Strategy 1). It is envisaged that in the absence of such systems, the other suggested action plans will either be difficult to implement or that they may never be implemented.

This section also includes an overall framework for Plan implementation, capacity building proposals and priorities, and an indication of resource requirements, except for financial resources, as explained above. The background information that was used in developing these proposals is given in Section 2, including the current situation and state of knowledge in the country on POPs issues and the institutional and other capacities available to address these.

1.3 Development of the Implementation Plan

This Plan was developed by GOT with financial assistance from GEF. These funds were provided for enabling activities in the POPs Project to assist the country in meeting its obligations under the Stockholm Convention. The implementation of the project stated in the project documentation to the GEF was to be carried out by the Secretary to Government, in the Office of the Prime Minister. The Office of the Prime Minister also includes the Department of the Environment, which, under the direction of the Secretary to Government, was the lead government agency for the project.

The POPs Project established a Project Coordinating Unit (PCU) and the National Coordinating Committee (NCC). The United Nations Environment Programme (UNEP) was the GEF Implementing Agency. The duration of the project was from April 2005 to May 2008, with a total funding of US$240,700; US$20,000 of which was provided by GOT through the provision of office space, its maintenance and upkeep and electricity. The POPs Project guiding objectives are as follows:

- Develop a comprehensive country driven NIP for the reduction and elimination of POPs in compliance of the provisions of the Stockholm Convention;
- Prepare the ground for implementation of the Convention in Tuvalu;
- Achieve a high level of awareness of the POPs issue and sustained ownership of the NIP among all stakeholders;
- Assist Tuvalu in meeting its reporting and other obligations under the Convention; and
- Strengthen Tuvalu's national capacity to manage POPs and chemicals generally.

The implementation activities to achieve the aforementioned objectives of the POPs Project were broadly aimed at creating sustainable capacity and ownership in Tuvalu to assist in meeting its obligations under the Stockholm Convention, including preparation of a NIP with the following components:

- Determination of coordinating mechanisms and organisation of process, public awareness-raising on POPs and other related hazardous substances;
- Assessment and strengthening of national infrastructure and capacity, adaptation of national legislation for Stockholm Convention implementation and establishment of a POPs inventory;
- Setting of priorities and determination of objectives for POPs management;
- Development of specific programmes to increase the awareness of the public and sectors potentially impacted by chemical pollutants;
- Formulation of a NIP and specific strategies; and
- Endorsement of the NIP by all stakeholders, including GOT.

In undertaking the above components, the POPs Project led to the following outcomes:

- Assessment of national capacity to implement the Stockholm Convention;
- The preparation of a preliminary inventories of POPs in Tuvalu;
- The completion and submission of the National Implementation Plan, including specific strategies required to meet Tuvalu's obligations under the Stockholm Convention;
- The strengthening of POPs management infrastructure and the raising of public awareness on POPs; and
- The establishment and strengthening of national capacity to meet reporting obligations under the Stockholm Convention.

The work for this project was guided by the NCC, which included representation from key agencies of GOT, GOT corporations, NGOs and the private sector and was chaired by the Secretary to Government[2]. Membership of the NCC is provided in Annex 2.

Wide consultation with stakeholders was deemed an important element in the preparation of the NIP. This was achieved through a combination of one-on-one interviews, island visits and related presentations and a number of national workshops. A list of the people directly involved in the process is also given in Annex 2. In summary, the key contributors were as follows:

[2] Since the last general election (8th April 2006), the Department of Environment has come under the Ministry of Natural Resources. The chairman of the NCC has since changed to the Secretary of the Ministry of Natural Resources

1.3.1 Government Ministries and Departments Involved

Agriculture, Customs, Fisheries, Home Affairs, Public Health, Energy, Marines and Port Services, Public Works Division, Environment, Waste Management Project, International Water Project and Economic and Research Development.

1.3.2 Government Corporations Involved

Tuvalu Cooperative Society (TCS) and Tuvalu Electricity Corporation (TEC).

1.3.3 Private Sectors Involved

British Petroleum (BP)

1.3.4 Non-Government Organizations Involved

Island Care, an NGO established by the Department of Environment, the Funafuti *Kaupule*, the Tuvalu Red Cross and the Tuvalu National Council of Women (TNCW).

2. Country Baseline

This section provides background information on Tuvalu, and the more specific information that was used in developing the proposals is given in Sections 2.2 and 2.3. This section includes the current situation and state of knowledge in the country on POPs issues and the institutional and other capacity available to address these. Much of the information given in this chapter were first reported in a related document titled *Tuvalu National Profile of Chemical Management*[3] prepared under the POPs Project.

2.1 Country Profile

It has been argued by various writers that Tuvalu is not the original name for the islands. This is mainly so because before foreign contact, each island was a separate state and therefore were identified by their own names. Refer to "Tuvalu: Location and the Islands".

2.1.1 Geography

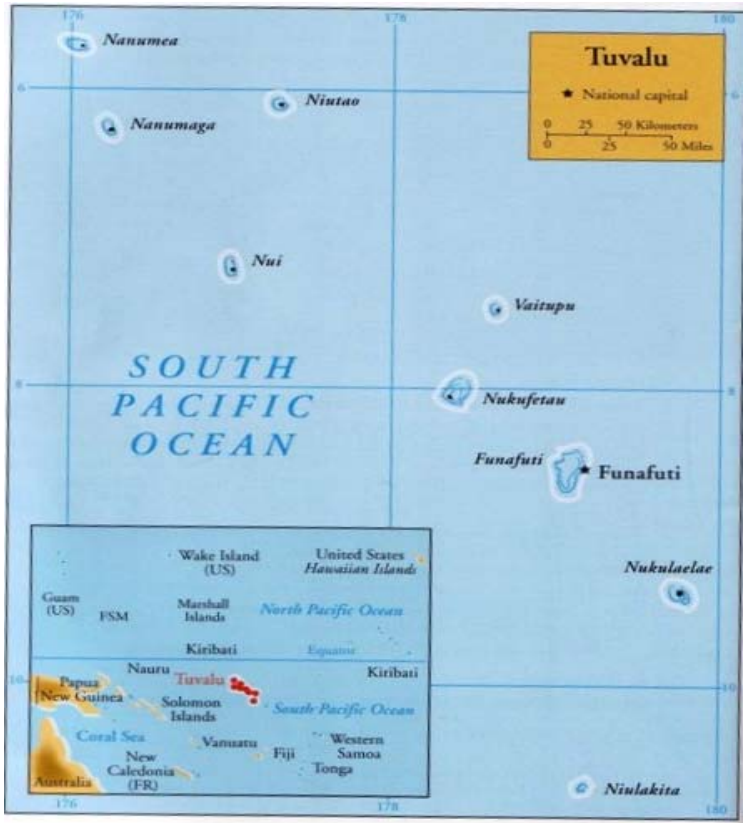
Location

Tuvalu consists of nine coral atoll islands. The islands are widely spread over 1.2 million square kilometres of the Pacific Ocean stretching in a north-south direction over some 560 kilometres between latitudes 5 and 11 degrees south and from 176 to 180 degrees east. The country's neighbors include Kiribati and Nauru to the north, the Solomon Islands and Vanuatu to the west, and Samoa, Fiji, and Tonga to the South. The capital, Funafuti, is an island approximately 1100 kilometres from Suva and 4000 kilometres from Sydney. Refer to the map "Tuvalu: Location and the islands".

Land Area

The total land area of the country is approximately 24.5 square kilometres. This area is relatively evenly distributed across the nine atoll islands. Most of the atolls range in sizes from 2.4 to 4.9 square kilometres except for the smaller islands of Niulakita and Niutao.

[3] Niuatui, Lomiata., and Ulika, Kiatoa., 2005, *Tuvalu National Profile of Chemical Management*, POPs Project, Department of Environment, Funafuti.



Tuvalu: Location and the islands

Land Formation

All the nine islands of Tuvalu are of low coral formations seldom rising more than five (5) metres above sea level. Five of the islands – Nanumea, Nui, Nukufetau, Funafuti and Nukulaelae are true coral atolls, with a continuous eroded reef platform surrounding a central lagoon. The other islands- Nanumaga, Niutao and Niulakita comprised of a single islet. Vaitupu has the characteristic of both an atoll and a reef island. The islands are composed of sand and coral material thrown up by wind and wave action.

Major sources of wind and wave action are the hurricanes. Major hurricanes were recorded in 1891, 1958 and 1972. The 1972 hurricane, Hurricane Bebe, swept over the island capital and caused extensive damages. Hurricane wind and wave action also causes most of the coastal erosion in the islands. For all islands, erosion is a continuous problem.

Climate

The climate is characterized by a consistently uniform temperature which ranges from 25 to 32 degrees centigrade, with high humidity and heavy rainfall during the westerlies (November to March). Rainfall averages about 3064 millimetres per annum. Droughts of up to three months can occur in the north-most islands of Nanumea and Nanumaga. The south-most islands lie in the hurricane belt and the whole group often has strong wind warnings.

2.1.2 Population

Although Tuvalu means eight, there are in fact 9 islands. The ninth, Niulakita, is a "colony" of Niutao and is administered from that island. Funafuti, the capital, is the most developed of the islands, in terms of both infrastructure and population. It is the first port of entry and has the only airfield.

The estimated population as of July 2005 was 11,636. About 4,000 (34%) of the total population of Tuvalu reside on Funafuti. Tuvalu is dominantly Polynesian with racial mixes of I-Kiribati and some mix-races of Tuvaluan and European descent. The island of Nui has strong cultural ties with Kiribati. The official languages are English and Tuvalu.

The average age of the population is 24.45 years with a birth rate of 21.91 [births per 1000 (2005 estimate)]. The average life expectancy at birth is 68.01 years, and the death rate is 7.22 [per 1000 population]. The literacy rate is 93% with education being free but compulsory from age 6 through 12. Secondary education starting from age 13 to 16 is not free but the government heavily subsidises school fees.

Tuvalu is isolated by any standard and its economy is very much dependent on external economic factors including factors affecting price of goods such as food items and oil. Its isolation, in combination with large distances from markets, affects prices of telecommunication and conducting business. There is presently one air service from Fiji, providing three weekly flights into Funafuti. Six of the outer islands lack sizeable reef channels to allow government passenger/cargo vessels to enter their lagoons. There is a once-a-month cargo vessel visit provided by the Pacific Forum Line (PFL) bringing in imported food, building materials and other items. Petroleum products are brought in by tanker every other month. This schedule, however, may extend over the two month schedule resulting in rationing and, at times, the shortage of some fuel products, especially benzene.

Because of the low topography of all of the Tuvalu islands, sea level rise is of major concern to the country. Tuvalu is becoming increasingly vocal in international meetings on this vulnerability. In late 2005, the Government of Tuvalu welcomed the news that the United Nations has approved that people moving away from their traditional abodes because of environmental problems could now be regarded as 'environmental refugees' and become protected as refugees under UN relevant refugee conventions. *Table 1* below summarizes the geographic and demographic characteristics of Tuvalu.

Table 1: Geographic and Demographic Profile of Tuvalu

Location	Oceania, island group consisting of nine coral atolls in the South Pacific Ocean, about one-half of the way from Hawaii to Australia
Geographic Coordinates:	8 00 S, 178 00 E
Map References	Oceania
Land Area	24.5 sq km
Area Comparative	0.1 times the size of Washington DC
Land Boundaries	0 km
Coastline	24 km
Maritime Claims	Territorial sea–12 nm; contiguous–24 nm; EEZ–200 nm
Climate	Tropical, moderated by easterly trade winds (March to November); westerly gales and heavy rain (November to March)
Terrain	Very low-lying and narrow coral atolls
Elevation extremes	*Lowest point:* Pacific Ocean 0 m *highest point:* unnamed location 5 m
Significant Natural resources	Fish, coconut
Natural Hazards	Severe tropical storms are usually rare, but, in 1997, there were three cyclones; low level of islands make them very sensitive to changes in sea level (king tides are also part of the natural hazards that Tuvalu is faced with)
Environment – Current Issues	Since there are no streams or rivers and groundwater is not potable, most water needs must be met by catchments systems with storage facilities (the Japanese Government has built one desalination plant and plans to build one other); beachhead erosion because of the use of sand for building materials; excessive clearance of forest undergrowth for use as fuel; damage to coral reefs from the spread of the Crown of Thorns starfish; Tuvalu is very concerned about global increases in greenhouse gas emissions and their effect on rising sea levels, which threaten the country's underground water table; in 2000, the government appealed to Australia and New Zealand to take in Tuvaluans if rising sea levels should make evacuation necessary
Environment - International Agreements	*Party to:* Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Law of the Sea, Ozone Layer Protection, Ship Pollution *Signed, but not ratified:* none of the selected agreements
Geography – note	One of the smallest and most remote countries on Earth; six of the coral atolls - Nanumea, Nui, Vaitupu, Nukufetau, Funafuti, and Nukulaelae - have lagoons open to the ocean; Nanumaga and Niutao have landlocked lagoons; Niulakita does not have a lagoon. Only Funafuti and Nukufetau have lagoons that can be accessed by government vessels.

2.1.3 Political Profile

Brief History

The original people of Tuvalu are believed to have arrived on the islands several hundred years ago. Tuvalu, then the Ellice Islands, became a British Protectorate in September 1892 and administered together with Kiribati from Fiji. The then Ellice Islands separated from Kiribati in 1975 and gained independence on October 1, 1978 and joined the British Commonwealth. The name Tuvalu became the official country name on gaining independence. In 1986 Tuvalu acquired Least Developed Country (LDC) status.

National Government

Head of State

Queen Elizabeth II of the United Kingdom is designated by Section 48 of the Constitution as Head of State, represented in Tuvalu by the Governor General who is appointed by and may be removed by the sovereign, acting with the advice of the Prime Minister. The Prime Minister is required to consult Parliament about any such appointment or removal.

To be Governor General, a person must be a citizen of Tuvalu, be eligible to be elected a Member of Parliament, and be at least fifty years old. The Governor General has the power to summon, prorogue, and dissolve Parliament, on the advice of the Prime Minister. No bill becomes law until assented to be by the Governor General.

Executive

The Executive comprises the sovereign, represented by the Governor General, and the Cabinet, which is headed by a Prime Minister elected by the members of Parliament from among themselves. The Cabinet is collectively responsible to parliament for the performance of the executive authority of government. Part V of the Constitution establishes the office of the Prime Minister and such number of other ministers as determined by the Head of State on the advice of the Prime Minister.

Legislature

The parliament of Tuvalu consists of a single chamber with fifteen members. All islands, except Nukulaelae, send two members each, two vote together for one member, while Nukulaelae send one member only. A speaker, elected by members of Parliament, presides at sittings. The normal life of Parliament is four years.

Judiciary

The Court system consists of the sovereign in council, Court of Appeal and the High Court, which are courts of general trial and appellate jurisdiction, and the Magistrates' Courts, Island Courts, and Land Courts, lower courts with limited jurisdictions. Currently, the Chief Justice of the High Court visits twice a year to preside over its sessions; its rulings can be appealed to the Court of Appeal, which has never heard any case.

Local Governance

The *Falekaupule* Act 1997 regulates the composition, operation, and functions of local governance. All eight islands are governed by a traditional council of elders named '*Falekaupule*'. The *Kaupule*, the executive arm of the *Falekaupule*, is made up of six elected members. A *Pule Kaupule* (head *Kaupule*) is elected by the *Falekaupule*. The *Kaupule* generally administer island affairs on behalf of the *Falekaupule*, and have powers to levy rates for operating costs and capital developments. The *Falekaupule*, on the other hand, is the law making body with powers to make bye-laws.

Emergency Powers

The declaration of public emergencies is regulated by Part II, Division 4 of the Constitution. The power to declare emergencies is vested in the Head of State, acting on the advice of the Prime Minister. A public emergency includes war or any circumstances deemed by the Head of State to be an emergency. A proclamation declaring a state of emergency lapse after three days or, if made when Parliament was not sitting, fourteen days, unless Parliament approves it, in which case it remains in force for up to six months. It may be extended by further resolution for periods each not exceeding six months.

International Linkages

Tuvalu's international relations policy recognises the important role small island developing states like Tuvalu play in the international political/economic arena and seeks to build upon the positive relationships which Tuvalu enjoys with a wide range of nations in the world. It also testifies to the political, cultural and economic values Tuvalu attaches to the political relations it is now forging with Asia (Japan and The Republic of China on Taiwan) and the traditional relationship it has enjoyed with the Pacific Forum States, Australia and New Zealand, ACP/European Union and the British Commonwealth.

Tuvalu is a member of the United Nations. It is also a member of a number of international and regional organisations such as the Pacific Island Forum, the South Pacific Applied Geoscience Commission, and the Secretariat of the

Pacific Regional Environmental Programme. The Ministry of Foreign Affairs and Trade (MFAT) is responsible for the overall co-ordination of Tuvalu's membership of these organisations and of its participation in the appropriate international flora.

Other Related Political Issues

Tuvalu adopted a Constitutional monarchy with a parliamentary democracy when it became independent in 1978. In 1992, the issue of becoming a republic was raised. The issue has again surfaced as recent as 2002. *Table 2* below summarizes the political profile of Tuvalu.

Table 2: Political Profile of Tuvalu

Government Type	Constitutional monarchy with a parliamentary democracy; began debating republic status in 1992
Independence	1 October 1978 (from UK)
National holiday	Independence Day, 1 October (1978)
Constitution	1 October 1978
Legal system	NA
Suffrage	18 years of age; universal
Executive branch	**Head of state:** Queen ELIZABETH II. The Head of State is now represented in Tuvalu by Governor General Reverend Filoimea TELITO (since 15 April 2005). **Head of government**: Prime Minister Apisai Ielemia (since 8 August 2006) Cabinet: Cabinet appointed by the Governor General on the recommendation of the prime minister. **Elections:** the monarch is hereditary; governor general appointed by the monarch on the recommendation of the prime minister; prime minister and deputy prime minister elected by and from the members of Parliament; election last held 3 August 2006.
Legislative branch	Unicameral Parliament, also called House of Assembly (15 seats; members elected by popular vote to serve four-year terms) elections: last held 25 July 2002 (next to be held NA 2006) election results: percent of vote – NA%; seats – independents 15
Judicial branch	Eight Island Courts (with limited civil & criminal jurisdiction); Senior Magistrate Court; High Court (a chief justice visits twice a year to preside over its sessions; its rulings can be appealed to the Court of Appeal of Tuvalu); eight Lands Court and a Lands Appeals Panel
Political parties and leaders	There are no political parties but members of Parliament usually align themselves in informal groupings
International organization participation	ACP, ADB, FAO, IFRCS (observer), IMO, ITU, OPCW, PIF, Sparteca, SPC, SPREP, UN, UNCTAD, UNESCO, UPU, WHO
Flag description	Light blue with the flag of the UK in the upper hoist-side quadrant; the outer half of the flag represents a map of the country with nine yellow five-pointed stars symbolizing the nine islands

2.1.4 The Economy and Profiles of Economic Sectors

Tuvalu's main exports are handicrafts and stamps. Revenues from abroad-fisheries licenses, telecommunications fees, marketing of Tuvalu Internet domain dot tv and revenues from the Tuvalu Trust Fund (TTF). In 2003 the national GDP was estimated at US$ 13.9 million. *Table 3* below summarises all sectors and their contributions to Tuvalu's Gross Domestic Product as well as the number of employees.

Table 3: Summary of Sector Contributions to GDP and Number of Employees per Sector

Sector	Contribution to GDP ('000) 1998	Contribution to GDP (%-1998))[4]	Number of Workers[5]	Major Products
Agriculture, Forestry and Fishing	3,484.2	16.38	43	Vegetables, livestock, fish, handicrafts, for domestic consumption and sale
Mining, quarrying	638.3	3.00	55	Aggregates and sand from the foreshore- for construction.
Manufacturing	881.0	4.14	3	none
Electricity, Gas, Water	574.4	2.70	99	Electricity, fuel, oil,
Construction	2,951.7	13.88	224	Construction
Trade, Hotel, Restaurants	2,971.8	13.97	359	Hospitality services, food, retailing
Transport, Communications	1,379.9	6.48	109	Travelling, freight, communications,
Finance, Real Estate	2,376.0	11.18	85	Banking services, rental houses

[4] Percentage contributions obtained from Table A2.1: GDP by Industry in Asian Development Bank, 2002, *Tuvalu- 2002 Economic and Public Sector Review*, page 194.
[5] Employee numbers obtained from Tuvalu Nationa Providend Fund (TNPF) records for the year 2005.

General Government	4,805.7	22.59	1339	Public administration, judiciary, etc.
Community, Personal Services	1,207.4	5.68	1249	Services- laundry,
TOTAL	20,769.4	100	3565	

Agriculture

Tuvalu does not have any agricultural export. Present agricultural produce such as vegetables and livestock of pigs and poultry are limited to domestic use but significant quantities are imported. The domestic focus of the Department of Agriculture (DA) is reflected in its mission statement stated in the 2006 National budget as "To develop the agriculture sector, to create alternative sources of income and to promote food security for healthy living". The DA focuses its operations on the outer islands where the agricultural sector is mainly for subsistence. The subsistence sector accounts for 6.2% of GDP while market production accounts for 1.7% (refer *Table 3* below).

Table 3: Agricultural Sector Contributions to GDP (1988 prices)[6]

	Market Production		Nonmarket Production	
	$'000	% of GDP	$'000	% of GDP
Crops	17.7	0.3	548.4	3.5
Livestock	82.0	1.4	430.3	2.7

Tuvalu Government National Budget 2006 shows four areas of DA's main focuses. These are Livestock Production, Food Crop Production, Pest Control and Surveillance and increasing the productivity of farmers. The Department has a projected total expenditure of $218,625 and budgeted revenue of $25,500[7].

Fisheries

Tuvalu does not export fish as of January 2007. The National Fishing Corporation of Tuvalu (NAFICOT), a GOT corporation established in the 1980s, has reduced its operations to a domestic level, supplying fish to the local population on Funafuti. Commercial fishing on the outer-islands' Community Fishing Centres (CFCs), operated by the NAFICOT, made a total loss of $79,443 in 2001 (ADB, 2002; p155). As of December 2006, all these CFCs were not operating.

Tuvalu, however, earns income from the licenses of ships from Distant Water Fishing Nations (DWFN) fishing in its EEZ. In 2001, revenue earned amounted to $11,795,400, which was 50.3% of the total government recurrent budget (ADB, 2002; p157).

The 2006 Tuvalu National Budget indicates that the Department of Fisheries has diverse focuses but its mission statement is to "maximise return from marine resources and strengthening fisheries databases:" It remains to be seen whether it is being applied at the domestic level or not or whether there is a long term financial return through its corporatized partner, the NAFICOT.

Forestry

Tuvalu has no forestry producing raw materials which can be exported to earn foreign income. The majority of its vegetation is coconut (about 70% or 2,100 hectares of cultivatable land) but these are presently used for domestic purposes. Copra and coconut oil production have declined and there is no production at present.

Minerals

There are no discovered minerals of value for export. Minerals referred to in *Table 3* were those of aggregates and sand obtained from the foreshore for construction of buildings and other structures such as sea-walls, water cisterns, toilets, roads and the like.

Tourism

Tuvalu has a very small tourism industry. Tourists are defined as being non-resident visitors who came to Tuvalu on holiday vacation as compared to non-resident arrivals who are business officials, visiting friends and relatives, those who transit and those on other purposes. *Table 4* below summarises the trend of non-resident arrivals in Tuvalu from the year 1997 to 2001 and provides a picture of the overall view of the tourism industry, small as it is, in Tuvalu.

[6] From Table 6.1; Asian Development Bank, 2002, *Tuvalu- 2002 Economic and Public Sector Review*, page 145.
[7] Government of Tuvalu, 2006, *Tuvalu National Budget 2006*, Funafuti, p113-115.

Table 4: Non-resident Arrivals, 1997- 2001

Year	Holiday Vacation (tourists)	Business Official	Friends/ Relatives	Transit Stopover	Other Purposes	Total
1997	164	483	218	101	72	1038
1998	213	475	192	36	90	1006
1999	83	252	159	9	26	529
2000	139	460	178	354	147	1278
2001	435	1187	529	399	263	2813

Table 5 shows the number of non-resident arrivals in Tuvalu for the year 2001 (ADB, 2001; p206) to illustrate the origins of non-resident arrivals into the country.

Table 5: Details of Non-resident Arrivals, 2001

Country	Holiday Vacation (tourists)	Business Official	Friends/ Relatives	Transit Stopover	Other Purposes	Total
Australia	36	266	68	29	46	445
New Zealand	15	140	38	14	25	232
Fiji/ Kiribati	75	360	272	78	76	861
Other Pacific	31	145	94	53	80	403
USA	38	23	16	22	2	101
Canada	3	7	0	9	0	19
UK	16	34	12	2	3	67
Germany	40	16	2	6	4	68
France	8	11	1	3	2	25
Other Europe	30	9	3	6	3	51
Japan	73	63	7	164	10	317
Other Asia	52	94	11	5	7	169
Other Countries	18	19	5	8	5	55
Total	435	1187	529	399	263	2813

Principal factors affecting tourist arrivals are

(a) high air fares and poor air services;
(b) low quality hotel accommodation and standards;
(c) undeveloped ecotourism operations;
(d) insufficient visitor information;
(e) poor urban environmental management; and
(f) poorly staffed and situated Ministry offices (ADB, 2001; p161)

Factor (e) may partially reflect the effect of poor chemical management which contributes to inadequate waste management issues on Tuvalu, a key factor in poor urban environmental management. According to an ADB report tourism can, if developed adequately, generate income into the country. The report states;

> "While the tourism sector is small, it nevertheless can stimulate the economy. The Tuvalu visitor survey of 1994 suggested that the average expenditure per visit of holidaymakers was $409, compared with $572 for business visitors and $232 for those visiting friends and relatives" (ADB, 2001; p162).

The survey indeed reflects how sound chemical management, as a component of the larger picture of environmental management, can be a contributing factor to the development of adequate solid waste management and therefore to the development of tourism as an industry with significant cash contribution to the Tuvalu economy.

Manufacturing

There is no manufacturing industry in Tuvalu. A garment making factory was in operation in the mid-90s but this is no longer the case.

Industry

The industry is dominated by the Tuvalu Electricity Corporation in the provision of electrical power and employs 73 people.

Chemicals and Petroleum

Petroleum products account for by far the largest quantities of chemical imports and "exports", the latter being used oils "exported" for disposal in other countries, currently being "exported" by BP to their sister company in Vuda, Fiji. Other chemical imports are as follows:

- Dyes, tanning agents, brighteners, paint pigments, resins and fillers, for use in the paint and printing industries.
- Industrial gases including argon, oxygen, nitrogen, and ammonia.
- Chlorine gas, hypochlorites, copper sulphate, alum and aluminium sulphate for water treatment and other uses.
- Various organic chemicals and solvents, including toluene and xylene, chlorinated hydrocarbons, hydrochlorofluorocarbons (HCFCs), acetone, (this is included in acids and alkali) and quaternary ammonium salts.
- Metal cleaners and plating compounds.
- Acids and alkalis.
- Personal products, including oils, perfumes, cosmetics, shampoos, lacquers, dental and shaving preparations, and deodorants.
- Household cleaners, including soaps, surfactants, cleaners, lubricants, waxes, polishes, and scouring powders.

2.2 Institutional, Policy and Regulatory Framework

The following section describes the overall institutional, policy and regulatory framework within which the NIP will be implemented. It has taken the *Malefatuga* Declaration as the policy basis of its development. This section also describes GOT departments and agencies shaping the preparation of the NIP.

2.2.1 Environmental/ Sustainable Development Policy and General Legislative Framework

Tuvalu's national policy towards the environment as part of its sustainable development policy is contained in the *Malefatuga* Declaration, a declaration that was unanimously endorsed by the delegates to the National Summit for Sustainable Development (NSSD) that convened in July 2005 on Funafuti. It declares the following eight strategic areas of development;

1. Good governance
2. Macroeconomic Growth and Stability
3. Social Development: Health, Welfare, Youth, Gender, Housing, and Poverty Alleviation
4. Outer Island and Falekaupule Development
5. Employment and Private Sector Development
6. Human Resource Development
7. Natural Resources: Agriculture, Fisheries, Tourism, and Environmental Management,
8. Infrastructure and Support Services (GOT, 2005, p.13).

The key risks faced by Tuvalu in its environment and stated in the *Te Kakeega II* are;

1. Sea-level rise as a result of climate change
2. Rising population density on Funafuti
3. Decline in traditional resource management
4. Unsustainable use of natural resources; and
5. Poor waste management and pollution control (GOT, 2005, p.42).

To cater for the above risks, the *Malefatuga* Declaration declares the following environment priorities and strategies for 2005 to 2015;

1. Develop and implement an urban and waste management plan for Funafuti;
2. Establish national climate change adaptation and mitigation policies;
3. Encourage international adoption of Multilateral Environmental Agreements, including the Kyoto Protocol; and
4. Increase the number of conservation areas and ensure regulatory compliance. (GOT, 2005, p.43).

The preparation of the NIP (draft) covers several of the above policies and takes into account the following specific policies. It should be noted however that the issue of chemical pollution affects most, if not all, of the above policies. The specific policy is to "*Develop and implement an urban and waste management plan for Funafuti*" [Environment Priority and Strategy 1]. While the NIP is developed for Tuvalu to satisfy requirements of the Stockholm Convention, it is also a part of satisfying requirements of the *Malefatuga* Declaration. The *Malefatuga* Declaration also adopted the Millennium Development Goals of the United Nations and is an indication of Tuvalu's commitment to sustainable development promoted by the UN.

While these policies and principles have been acknowledged for many years, until recently there has been no specific legislation to address most of Tuvalu's environmental problems. In June 2008, the GOT passed the Environment Act. The Act establishes a broad framework for the protection of natural resources in Tuvalu, for the control and management of developments, and for waste management and pollution control. *Table 7* shows the various chemically related legislations existing in Tuvalu, which may be used, in the absence of a specific legislation for POPs, to control and manage POPs issues in Tuvalu.

2.2.2 Roles and Responsibilities of Government Agencies

The information contained herein regarding activities of individual agencies/departments is abstracted from the *Tuvalu National Budget for 2006*. In this way, the NIP can correctly reflect what outputs are expected of the departments since activities in the budget can only be done if they have been budgeted for. It is generally understood that activities that may be relevant (to sound chemical management and others) but were not budgeted for will not be undertaken, unless it is an emergency.

The tables given in each Ministry provides an overview of their activities. The Ministries (and departments viewed) are those believed to be involved in the environment and current environmental issues providing an insight as to how these GOT agencies interact with the NIP for the Stockholm Convention. These tables have been adapted from the *Tuvalu National Budget 2006*.[8]

Office of the Prime Minister

Table 6 summarises the content of the Office of the Prime Minister (OPM), their outputs and program activities. OPM[9] consists of the following departments;

a) Secretary to Government;
b) Foreign Affairs
c) Tuvalu High Commission (in Fiji)
d) Personnel and Training
e) Labour
f) Permanent Mission to the UN
g) Meteorological
h) Environment

The accountable officer is the Secretary to Government, which is also the Secretary to Cabinet and Chairman of the NCC to the POPs Project. Most of the current environmental works are coordinated through this office.

The activities within the Department of Environment (DE) include implementation and monitoring of activities affecting the environment, and the development of policies on waste management, environment impact assessment and land and marine resources. It is the executive agency for the management of ozone depleting substances in Tuvalu, and also has major projects in the areas of climate change and the National Biodiversity Strategy and Action Plan (NBSAP). The DE was the lead agency for the GEF enabling activity project on POPs, which led to the preparation of this NIP.

Table 6: Office of the Prime Minister: Output and Activities 2006

Output	Activities
A. Headquarters (Secretary to Government)	
1. Cabinet transparency and accountability	1. Cabinet code of conduct; 2. Leadership Code 3. Monitoring of Cabinet decisions; 4. Establishment of formal linkage between Cabinet and DCC.
2. Maintain good international relations with other nations and international organisations for the benefit of Tuvalu.	1.Implementation of performance-oriented institutional reforms; 2. Implementation of corporate-board reforms; 3. Commercialise all ministry service functions; 4. Introduction of "user-pay" service delivery.
3. Strengthen the functional relationship between line ministries	1. Formulate standing procedures for submitting policy papers to DCC; 2. Design a more comprehensive procedure for disseminating Cabinet decisions and policy.
4. Disaster mitigation, awareness and rehabilitation.	1. Conduct disaster awareness workshops; 2. Prepare disaster response plan; 3. Conduct island vulnerability plans; 4. Rehabilitation programme.

[8] An electronic version (Word) of the budget was obtained with permission from the ERDP.

[9] As of January 2007, Environment is in the Ministry of Natural Resources.

5. Implementation of projects financed under SDE	1. Identify suitable projects for SDE funding; 2. Provide ministries/ departments with technical and administrative support on all SDE projects; 3. Assists with SDE project design, management, monitoring and coordination. 4. Regular consultations with Ministers and Secretaries on SDE projects (e.g meetings)
B. Foreign Affairs	
1. Establish, maintain and monitoring of international relations with other Governments and international organisations.	1. Frequent communication and contacts with overseas governments, missions and international organisations, 2. Continuous review, monitoring and coordination of programmes with other governments, etc. 3. Updating of information on programmes with other governments, missions and international organisations. 4. Establish new programmes, 5. Review and update Tuvalu's foreign policy. 6. Represent Tuvalu at regional and international conferences.
2. Maintenance of a high standard of international and national services to dignitaries and foreign nationals.	1. Upkeep of VIP lounge, 2. Good protocol programmes for visiting dignitaries, 3. Good security arrangements for visiting dignitaries, 4. Good hospitality.
C. Tuvalu High Commission	
1. Overseas representation and promotion of relations.	1. Maintain Tuvalu representation in Fiji and in the region, 2. Promote appropriate linkages and contacts for Tuvalu in Fiji, 3. Develop bilateral technical cooperation agreements.
2. Support services	1. Protocol Agreements and arrangements in Fiji, 2. Coordination of training, medical and purchasing arrangements, 3. Intelligence and information systems and networking.
D. Personnel and Training	
1. Effective management of the Public Service through strengthening support to the PSC. PSC shall ensure the Public Service is efficiently managed and controlled.	1. Provide support services on all personnel related matters. 2. Recruitment and positioning of civil servants 3. Identify target areas of training. 4. Timely discipline. 5. Justified compensation of service.
2. Production of good quality education and training for Tuvaluans (public and private) at all levels.	1. Securing of student placements and funding, 2. Scholarship interviews, 3. Student management performances and monitoring, 4. Identify training needs, 5. Formulate and implement scholarships and in-country training plans.
3. Formulation of training and scholarship policies and necessary legislation reforms.	1. Identify training needs 2. Formulate and implement scholarships and in-country training plans.
E. Labour	
1. Coordination and monitoring of work schemes PAC and Young Ming recruits	1. Analysis of individual applications, 2. Monitoring of financial matters, 3. Consultation and assists local recruits.
2. National Employment Register (NER)	1. Formulation of survey instruments, 2. Identification, coordination and liaising with data sources, 3. Pre-testing and validation of survey instruments, 4. Data analysis, 5. Data consolidation, 6. NER completed.
F. Permanent Mission to the UN	
1. (i) Effective representation of Tuvalu's identity, values and concerns in the UN and the USA including Tuvalu's strong support to ROC and climate change issues (ii) Enhanced collaborations within the UN membership and other international players to maximise opportunities that are of economic and political benefits to Tuvalu. (iii) Improved coordination of participation in UN activities to promote mutual understanding between Tuvalu and UN.	1. Provide regular advice to Cabinet on UN activities and relevant happenings in the US through Mission reports 2. Present credentials to Washington as Ambassador to USA 3. Build stronger international identity and presence for Tuvalu in the UN and its agencies and the USA 4. Strengthen bilateral diplomatic friendship with UN members 5. Improve liaison with friends of ROC in New York to promote ROC's membership in UN and WHO 6. Promote and facilitate wider participation of Tuvaluans at UN meetings to enhance understanding of the UN roles and work 7. Explore development opportunities within the UN and its agencies, and secure working placements for Tuvaluan Nationals in the UN 8. Streamline the resources and operations of the Mission to assist improve implementation of Tuvalu's foreign policy.
G. Meteorological	
1. (i) Meteorological/ Climate Observations (ii) Collection of Meteorological & Climatologically data	1. Obtain Surface, upper Air and Sea Level Observations. 2. Routine maintenance of instruments, equipment and computers. 3. Maintain cleanliness of workplace and computers 4. Timely repair of equipment and infrastructure 5. Training of staff
2. (i) Weather & Climate Predictions (ii) Improved Weather Predictions (iii) Support services to Global Forecasting Network	1. Maintain provision of weather & climate forecasts. 2. Availability of monthly climate summaries and statistics 3. Ensure user community understands the prediction products 4. Training of staff 5.Prepare submission for the need to become a member of WMO.

(iv) Monitoring and Reporting of Greenhouse effects	6.Prepare submission for the need to have a Climate Change Policy 7.Involvement in UNFCCC programmes and in climate and sea level projects.
3. Management of Meteorological assets, staff and services	1. Maintain continuity and operational of Weather Offices and Stations. 2. Availability of financial status from votes. 3. Assessment and Reporting 4.Availabillity of updated manuals and reading libraries. 5.Training of staff
H. Environment	
1. Administration (Policy and Management Services)	1 Development of an Environmental Act. 2 Development of environmental policies and legislations and other administrative commitments 3 Attendances of Conference of the Party meetings, which Tuvalu is a party to and Provide information to DCC and cabinet 4 Conduct Environment impact Assessment (EIA) 5 Carry out Public Environment awareness 6 Development of NCSA 7 Development of NAP for the UNCCD
2. Biodiversity	1.Development of a National Biodiversity Strategy 2. Preparation of a 3rd National Report to CBD 3. Development of a Clearing house Mechanism 4. Development of Conservation areas for islands of Tuvalu. 5. Attend to Biodiversity international related meetings, such as CBD COP meetings, and technical meetings of the CBD.
3. Climate Change	1. Attend to meetings of the UNFCCC and other related commitments. 2. Preparation of Second National Communication 3. Establishment and update of climate change baseline data 4. Conducting of vulnerability and adaptation assessment.
4. SDE (Waste Management)	1. Production of Waste management Plan for Funafuti 2. Municipal solid waste: (municipal solid waste collection, controlled landfill) 3. Waste water management: (septic tank pump out and dump at piggery waste tank 4. Hazardous and special waste: (upkeep storage site, collection and incineration of medical waste, disposal system for used oil, construction of one model pagers) 5. Administration and management☹ground water monitoring around landfill, environmental monitoring system and general management.

While the POPs Project is not featured in the outputs for the DE, it started, as previously mentioned, in July 2005 and according to the PCU of the project, is expected to terminate in early 2008 when the final NIP has been prepared in consultation with all stakeholders on Funafuti and from the outer islands.

Table 7: Summary of Key Legislations Relating to Protection of Human Health and Environment, and the Sound Management of Chemicals

Legal Instrument (Type, Reference, Year)[10]	**Responsible Ministries or Bodies**	**Chemical Use Categories Covered**	**Objective of Legislation/ Regulation**	**Relevant Articles/ Provisions**	**Resources Allocated**[11]	**Enforcement Ranking**[12]
Petroleum Act (Cap. 42) [1st September 1968]	Department of Energy	Petroleum, Ordinary Petroleum, & dangerous petroleum	The Act regulate the importation, storage and sale or petroleum and to provide for matters relating and incidental thereto.	All.	unknown	1
Petroleum (Rationing) Regulations [LN: 41 of 1974]	Same as above.	Same as above.	The Regulation applies to such island or other place as the Minister may by notice designate; and to all sales of petroleum whether by wholesale or retail.	Reg. 3 [Rations permits]	unknown	1
Petroleum (Control of Storage) Regulations [LN: 23 of 1975]	Same as above.	Same as above.	Control the storage of petroleum.	All.	unknown	2
Petroleum (Sales Permit) Regulations [LN: 25 of 1984]	Same as above.	Same as above.	For the licensee to obtain from the Inspector sales permit.	All.	unknown	2
Merchant Shipping Act (Cap. 64A), [Act 11 of 1987], Marine Pollution Act	Department of Marine & Port Services	Part IV deals with carriage of dangerous goods.	An Act to make provisions for the registration of ships, the control and regulation of merchant shipping, the proper qualification of persons employed in service at sea, the regulation of the terms and conditions of persons so employed; and for connected purposes.	Part IV, Division 3, sections 59 to 64.	unknown	1
Pesticides Act (Cap. 39A), [Act 4 of 1990]	Ministry of Natural Resources; [Agricultural Officer]	Pesticides	An Act to control the importation and use of pesticides; and for connected purpose.	Register of pesticides [s.9], Import of pesticides [s.10], Application of Customs Act [s.11], and Prohibition of imports & Exemptions [s. 13].	unknown	3
Customs Act Cap. 55), [1st July 1964]	Ministry of Finance & Economic Planning; Customs Department.	May include POPs if declared under s. 34	An Act relating to the collection and management of the revenue of customs	Goods prohibited or restricted to be imported Schedule 2 [s. 34]. Also sections 33, 35, & 36.	unknown	2
Harbours Act (Cap. 88), [5th June 1957]	An Act relating to pilots, harbours and shipping therein		Controls dumping in harbours		unknown	2
Public Health Act 1926 (Cap 35) & Public Health Regulations 1926						
Quarantine Act (Cap 34)						
Falekaupule Act 1997			Administration of *Kaupule*, replaces the old Local Government Act.			
Pharmacy & Poisons Act 1926						

10 For reference, the original texts for these Laws, Regulations, Standards and Degrees can be viewed at the Office of the Attorney General.
11 Budget and person years.
12 Effective (1), fair (2), or weak enforcement (3).

Legal Services

Table 8 below presents outputs and activities the Office of the Attorney General (OAG) is involved in for 2006. In association with DE, it prepared the Environmental Bill. The Bill was passed on 6 June 2008. The People's Lawyer's Office also plays a role in environmental matters in regard to explaining obligations of individuals under environmentally related legislations or assisting individuals when prosecuted under these legal instruments.

Legal Services consists of

a) the Office of the Attorney General (OAG) and
b) the People's Lawyer.

Table 8: Legal Services- : Output and Activities 2006

Output	Activities
A. Office of the Attorney General	
1. Provision of quality and timely legal services to Government departments & agencies to Parliament.	1. Attendance at Cabinet & Parliament meetings. 2. Legislative drafting. 3. Legislative interpretation. 4. Drafting contract agreements and other legal instruments the Government is involved. 5. Regular and prompt legal services to Government agencies.
2. Representing GOT in civil litigation and discharging the functions and duties of DPP.	1. Review and supervise criminal investigations and prosecutions 2. Prosecution of major criminal cases & representing the govt interests in civil litigation
3. Administration and management of the Companies and Partnership Acts, Births Deaths and Marriages Act and Patents and Copyright Acts.	1. Maintain an effective and efficient procedure and system of registering business organisation in Tuvalu; 2. Process and monitor performance of registered companies; 3. Register and monitor an update list for births deaths and marriages; 4. Issue certificates/orders and certification of births deaths and marriages in Tuvalu. 5. Maintain an efficient and effective procedure and system of registering trademarks, patent, design and copyright; 6. Review current and draft new intellectual property legislation;
	7. Implement and manage the Regionally focused Action Plan (RFAP).
4. Provisions of quality and timely legal and legislative services to Parliamentarian, and provisions of Law Revision and Law reform, and the implementation of international conventions for which Tuvalu is a party to.	1. To keep under review the laws of Tuvalu; 2. To review and update the Constitution; 3. Provide legal services to Parliamentarian; 4. Legal drafting; and 5. Review and monitor the effective implementation of Treaties and Conventions.
B. People's Lawyer	
1. Public consulting and advice.	1. To represent and provide advocacy to those accused before the criminal courts - the Island/Resident magistrate and the High court. 2. To represent, and prepare all documents necessary in civil proceedings before the Resident Magistrate, and High court ensuring that all rules of court are complied with. 3. To provide conciliation to try & settle civil cases & narrow down the issues in question. 4. To represent the public in any legal matter against the Government of Tuvalu. 5. Tour the outer islands for giving effective legal advice. 6. To provide prompt legal advice, & assistance. 7. To tour the Outer Islands at least twice a year to provide a legal service to all those that made such a request.

Parliament

The office of the Parliament plays a role in the environment by acting on matters related to the environment in accordance with its procedures as indicated in its activities. For instance, the "Distribution of Parliamentary documents to all Members, Secretaries and others who are directly involved. Bills are to be distributed to all Island Councils with copies of debates on first readings". Where the environment is of concern the promptness or otherwise of this activity can well determine if the issue is acted upon sooner than later.

Table 9: Parliament- : Output and Activities 2006

Output	Activities
1. Administrative and support services for Parliament, its Members and Committees.	1. Advise on parliamentary procedure. 2. Preparation of the Order Paper and Notice Papers for Parliament sessions and the arrangement of Select Committee Meetings 3. Servicing sittings of Parliament and Select Committee 4. Distribution of Parliamentary documents to all Members, Secretaries and others who are directly involved. Bills are to be distributed to all Island Councils with copies of debates on first readings. 5. Records safekeeping.

	6. Broadcasting of the proceedings of Parliament. 7. State Opening of Parliament. 8. Following up of motions passed by Parliament and commitments made Government 9. Following up of reports by Constitutional Institutions 10. Printing of Hansard, Select Committee reports and Parliamentary Papers 11. CPA and APPU meetings

Ministry of Finance, Economic Planning and Industries

The Ministry consists of eleven departments as follows;

a) Secretary of Finance, Economic Planning and Industries
b) Economic Research and Policy Division
c) Statistics
d) Customs
e) Postal
f) Budget
g) Treasury
h) Trade, Investment and Industries
i) Tourism
j) Inland Revenue
k) Aid Management

Of the eleven departments in this Ministry, two are represented in the POPs Project NCC. They are the Economic and Research Policy (ERDP) and Customs. The other departments are not so relevant to the environment, and in particular the POPs issue. The Department of Customs (DC) is envisaged to play a critically important role in the "defence" against POPs imports by its proposed role of identifying and stopping POPs chemicals at the point of entry.

Table 10: Ministry of Finance, Economic Planning and Industries- : Output and Activities 2006

Output	Activities
A. Headquarters	
1. High quality administrative, economic and financial policy support for the Minister, Cabinet and Government.	1. Formulation, implementation and monitoring of Governments economic and financial policy. 2. Devolve more financial responsibilities to line Ministries. 3. Overseeing of the management of the Government's investment funds. 4. Management of Boards under the responsibility of the Ministry. 5. Administrative support to the Ministry and the Minister.
Economic Research and Policy Division	
1. Sound Policy Advice and Quality Research	1.Conduct Research and provide advice in areas of interest to the Government of Tuvalu. 2.Evaluations and appraisal of projects and policies. 3.Participate and advice DCC task forces / specific policy committees. 4.Assisting donor feedback and briefings on economic issues.
2. Successful implementation of 'Te Kakeega II' and 'Tuvalu's MDGs Report'	1. Coordinate the implementation of ""Te Kakeega II". (i) Assisting Ministries with their Corporate/Sectoral Plans (ii) Review and Update the Medium Term Framework Assisting Ministries with their Corporate Plans. 2. Coordinate the implementation of Tuvalu's MDGs (i) Advocate MDGs (ii) Assisting Ministries/Departments and civil society in incorporating Tuvalu's MDGs into their corporate and Sectoral plans
3. Provision of budgetary advisory services	1. Prepare Policy Framework for 2007 Budget 2. Coordinate the Core Budget Team (i) Analysis of all Ministries financial performance (ii) Production of a comprehensive National Budget timetable and provide assistance where necessary (ii) Ensure all submissions are due on the due date 3. Prepare budget outturns 4. Production of virement and supplementary schedules
Statistics	
1. Publication of select set of social and economic statistical reports for use by policy makers and the general public.	1. Compile and publish: a) The Quarterly Consumer Price Index b) The Quarterly Statistical Report c) The Quarterly/Annual PRISM indicators 2. Supervise and support consultants engaged to compile and publish the: a) National Accounts for 2004 b) Balance of Payments for 2003-2004 3. Final report for the Household Income and Expenditure Survey on the selected outer islands
Customs	
1. Corporate Management	1. The administration will have grater capability and capacity to operate as effective and efficient Customs Services 2. The office will provide leadership and services to members of staff to achieve long-term objectives and fulfil the terms and condition of the services 3. The office will be able to show staff achievements,

	progress and will strengthen cooperation between the private sectors
2. Revenue and Trade facilitation	1. Policy and procedures of cargo clearance 2. Strengthen revenue collection
Postal	
1. Mail services & International Postal Courier	1. Delivery of mails 2. Collection of mails 3. Sorting of mails 4. Sales of stamps 5. Mail accounting 6. Courier Express 7. Registered Mail 8. Processing of money order 9. Purchase of PF25 & PF27 10. Salaries 11. Outer islands auditing
2. Telegraphic Money Order Services & Post Shop Services	1. Processing of money orders 2. Purchase of PF 27, 25, 29a&b 3. Salaries 4. Outer islands auditing 5. Sales of postal goods and stationeries 6. Preparation of indent
Budget	
1. Budget management and financial monitoring	1. Analysis of all ministries financial performance. 2. Analyse and appraise of requests for DWs, De-reservations, Virements, and Supplementaries from ministries. 3. Passing of PVs, and LPOs for payment including JVs.
2. Production of the National Budget	1. Production of a comprehensive National Budget timetable and provide assistance where necessary. 2. Production of the Appropriation Bill. 3. Production of Virement & Supplementary schedules.
3. Central Asset Management	1. Continue update of assets registers for each department & Corporations 2. Co-ordinate training on the use of the assets register & simply 'Assets Policies & Procedure Manual'. 3. Update appropriate assets policies with Secretary of Finance. 4. Devise & maintain a system to take into account the movement of assets between departments and disposal & acquisition of assets. 5. Integrate assets maintenance into the annual budget. 6. Implement training strategy identified by TA training 7. Produce depreciation schedules on monthly basis. 8. Follow up legislation review related to assets management.

Treasury	
1. Financial reports	1.Preparation of all financial accounts. 2.Production of Monthly Cash-flow statements 3.Analyse and appraise requests for DWs, De-reservations, virements and supplementaries forms 4.Evaluate and provide sound advices on the Govt financial status
2. Accounts and Payroll	1. Payments of fortnightly pay to NBT and monthly pay to TNPF 2. Updating payroll informations 3. Preparation and dispatching of payslips and payroll breakdown 4. Reconciliation of all Govt accounts 5. Checking and batching of accounts
3. Reconciliation	1. Monthly bank reconciliations 2. Updating and postings to ledger accounts 3. Checking of all returns including Ministries return, outer islands returns, Suva accounts, pay-ins, etc 4. Checking and batching of all PVs, LPOs, Journals, etc. 5. Passing PVs and LPOs for payments including JVs 6. Data entry & updating of all Govt transactions into the ACCPAC system 7. Preparing payments and receipts 8. Timely collecting of RBC's from outer islands.
Trade, Investment and Industries	
1. Improve trade performance of the economy	1. Awareness programmes on Bilateral and Multilateral Trade Arrangements that Tuvalu is part of 2. Revive the coconut industry (DME project and copra) 3. Promote Pacific Trade Offices assistances to the private sector.
2. Business investment and industries development	1. Conduct business promotion and seminar 2. Business management training programme 3. Preparation of business manual 4. Business Radio Programme 5. Small Business Competition 6. Strengthen the effectiveness of the Price Control Board
Tourism	
1. Tourism coordination, marketing and promotion	1.Formulation of Tourism Policy 2.Maintain affiliation of Tuvalu to the SPTO 3.Dissemination of information on Tuvalu to inquiries from abroad 4.Administrative support to the Vaiaku Lagi Hotel (VLH) 5.Active participation at the major investment fairs 6.Active participation and training of locals in the provision of services for tourism development 7.Provision of supporting infrastructure for the tourism industry 8.Awareness programs in ecotourism activities

Inland Revenue	
1. Increase tax /revenue collection	1. Recruitment of new qualified and motivated staffs 2. Established a computerized tax system 3. Staff training on auditing 4. Enhanced law enforcement 5. Implementation of new proposed tax system
2. Minimize non-compliance level in Tuvalu	1. Imposing heavy penalty on non-compliance business 2. Regular consultations between tax department and tax payers 3. Introduce a self assessment system (SAD) 4. Establish a tax payer unique identification number (TIN) 5. Conduct frequent workshops to educate tax payers 6. Translation of tax materials to Tuvalu language 7. Monthly financial reports reconciliation with Treasury 8. Suspend business operation
Aid Management	
1. Aid Management & Co-ordination	1. Secure ODA funds 2. Disbursement of ODA funds 3. Monitoring & Evaluation of ODA funds. 4.Project Appraisal 5.Project monitoring 6.Informing DCC on XB funding 7.Explore new donors partner
2. Production of PSIP	1. Screen and Appraise all project proposals 2. Seek DCC approval 3. Formulate PSIP budget 4. Secure ODA funds

Ministry of Works and Energy

The Ministry consists of three (3) departments;

a) Headquarters Secretary of Works and Energy
b) Energy
c) Public Works

The Energy and the Public Works departments are represented on the POPs Project NCC. Both departments deal with chemicals which can be hazardous and/or contain POPs.

Table 11: Ministry of Works and Energy- : Output and Activities 2006

Output	Activities
Headquarters	
1. Policy Formulation and Administration.	1. Review and update existing policies issued by the Ministry. 2. Formulate policies and plans to efficiently implement the Ministry's responsibilities. 3. Formulate efficient and effective administrative systems for the whole Ministry.
2. Prudent management of financial and fixed assets allocated to the Ministry.	1. Set up an efficient financial management and monitoring system of the Ministry's Budget and maintain and up-to-date register of its fixed assets.
3. Formulation of energy plan to utilise other sources of energy that are more cost effective and environmentally friendly.	1. Prepare and implement an energy plan. 2. Review and evaluate the status of TSECS.
4. Produce a Building Code and improve the standard and quality of services rendered by GOT through PWD.	1. Prepare and implement a Building Code for Tuvalu. 2. Arrange in country and overseas training for the PWD staff and local tradesmen.
Energy	
1. Overall management and administration of the Energy Department by formulation and implementation of approved policy.	1.Formulate national energy policies that support development of Energy Sectors 2.Implement all energy policies already approved by Cabinet 3.Work closely with regional organisations like SOPAC, SPC and SPREP as a means to support national energy programs 4.Inspect and provide training related to safe handling of petroleum products 5.Provide appropriate advice to energy related sectors like TEC, TSECS and BP Ltd, and 6.Plan and co-ordinate all new and renewable development projects 7.Coordinate and follow up on PIREP project within the country.
2. Introducing the most cost effective and Sustainable New and Renewable technology which is viable for hybrid, installation & maintaining of PV system, training solar technician, inspection of petroleum depot and collecting of energy data.	1. Maintain PV (photovoltaic) systems on Niulakita and Funafala 2. Provide training for solar technicians on outer islands 3. Rehabilitate existing PV-system 4. Install PV/Diesel Hybrid systems for outer islands Health Centre's 5. Collection of PV- system tariff 6. Formulate project proposals for developing energy related sectors 7. Assess and collect outstanding tariffs 8. Update GHG Inventories 9. Sell solar items 10. Control and manage solar programmes 11. Consult with outer islands communities on issues pertaining to the promotion of clean energy 12. Carry out economic assessment related to the reliability of the

	current Rural Electrification project 13. Produce radio programmes to promote clean and appropriate energy sources required to develop economic activities 14. Disseminate energy conservation information to the public 15. Conduct workshops and trainings related to Energy Conservation practice 16. Carry out energy auditing of all government office. 17. Update the national Supply/Demand Side Database 18. Inspect outer island petroleum station and fisherman storage area 19. Issuing of Petroleum Ration Licence 20. Coordinate PV Solar programmes in the country.
3. Planning and preparation of renewable energy projects	1. Update solar equipments 2. Maintenance/upgrading solar systems 3. Compiling reports 4. Planning/preparation of renewable energy projects 5. Conduct research of potential renewable energy source for Tuvalu
Public Works	
1. General Administrations, Store, and financial Monitoring	1. Controlling of financial expenditure and revenue and maintenance of vote books 2. Appraise requests for Building, Electrical, Plumbing, Mechanical, Architectural Civil and Administration requirements. 3. Preparation and processing of PVs and LPOs for payment. 4. Analysis and appraise requests for indents, departmental warrants, de-reservation, virements and supplementary (if necessary) 5. Assessment of outstanding arrears. 6. Technical assessment of proposals submitted by ministry. 7. Assessment of PWD equipment requirements. 8. To carry out stock taking of all materials in the store. 9. Centralised PWD store. 10. Expand and upgrade storage facilities. 11. Review current store management system.
2 Architectural Services	1. Review the design application forms for the completeness of information considered essential as a prerequisite to a formal preliminary design 2. Prepare preliminary estimates. 3. Prepare final design employing overseas consultations where required. 4. Produce a working set of drawings along with the appropriate specifications and schedules. 5. Perform a quantity take off if required producing a Bill of Quantities. 6. Produce Tender Documents. 7. Put out to tender.
	8. Make a tender report as to the success of the contract with regards to the conduct of the contractor and any other relevant information. 9. Management of on going design work. 10. Testing materials. 11. Revise and maintain procedure manual. 12. Abstract materials from bill of quantity for ordering purpose 13. Assess overseas quotations and confirm order
3 Building Supervisory Services	1.A supervisor is assigned to a contractor to monitor and supervise the maintenance work 2. PWD will verify all materials used on the work and passed to Personnel for payment. 3. Renovation of Government houses 4. Maintenance of Government houses.
4 Furniture manufacturing	1. All government furniture are received for maintenance. 2. Manufacturing furniture to cater the public and private sector
5 Civil Engineering Services.	1. Providing technical advice on civil works 2. Approving the structural designs of civil works 3. Supervising civil works tendered by the private sector. 4. Concrete blocks manufacturing. 5. Maintenance of Airstrip 6. Maintenance of Roads
6 Mechanical Services.	1. To ensure spare parts are readily available. 2. Procurement of appropriate tools to carry out work effectively. 3. Vehicle maintenance. 4. Plant and equipment repair. 5. Assist maintenance of Nivaga II requirement 6. Handcart manufacture
7 Water & Plumbing Supervisory Services.	1. Monitoring and supervising contractors tending to plumbing works 2. Supply and maintain stoves for government quarters 3. Supply and maintain electrical pumps to government quarters 5.Government water cisterns and tanks repair and maintenance 6.Assist in fixing Nivaga II plumbing system 7.Desalination maintenance and repair
8. Water Distribution Services.	1. Monitor and distribute water purchased by the general public 2. Supply purchased water to domestic and foreign vessels. 3. Desalination maintenance and repair
9 Electrical & Air-conditioning Supervisory services.	1. Monitoring and supervising the private sector tending to government electrical requirement. 2. Supply and maintain government quarters with deep freezers and refrigeration. 3. Supervise the private sector tending to government air conditioning maintenance. 4. Maintain government air conditioning, deep freezers and refrigeration if unable to perform by the private sector.

	5. Electrical rewiring to government quarters. 6. Supervise and inspect new electrical installation and utilities in government quarters.
10.Vaitupu PWD Supervisory services.	1. Monitor and supervise contractors undertaking government house and Motufoua maintenance requirement. 2. Undertake supervisory role on minor development projects. 3. Supervise contractors engaged in maintaining and manufacturing of government furniture.

Ministry of Health

The Ministry of Health is represented on the POPs Project NCC. Currently it is represented by the Primary and Preventative Health Services (specifically a member of the Environmental Health Services). The Environmental Health Service's activities clearly indicate its involvement in chemicals, which may contain POPs, and in general hazardous and medical wastes.

The active roles the outer island representatives of this particular Ministry play on these islands makes these officers (and health committee members) important, and essential, in regard to the reduction and elimination of POPs throughout Tuvalu.

The Ministry as a whole is critical in the POPs issue, as they import, use and dispose the majority of chemicals in Tuvalu, many of whom have unknown effects on the environment and on human beings.

The Ministry consists of the following departments;

a) Secretary of Health
b) Health Administration
c) Curative
d) Primary and Preventative Health Services

Table 12: Ministry of Health- : Output and Activities 2006

Output	Activities
Headquarters (Secretary of Health)	
1. Policy advice and administrative support	1. To fulfil Cabinet and Parliamentary commitments. 2. Improve co-ordination of functions and actives. 3. Restructuring of staff within the department. 4. Representing government to regional & international meetings.
	5. Monitoring of Tuvalu Medical Scheme & NZ Medical Scheme 6. Ensure that the budget is well controlled 7. Recruitment of financial officers
Health Administration	
1. Provide technical advice and initiate a reform of the health system	1. Develop relevant health policies in conjunction with the MDG and submit to Cabinet for endorsement. 2. Monitor the 2006 health budget and hence formulate the 2007 health budget 3. Monitor health projects which externally funded by WHO, UNFPA, SPC, AusAid, NZAID, Global Fund, etc. 4. Improve the existing health information system and establish a network plus an Open Learning Centre within PMH Complex 1. Develop a Health Corporate Plan 2. Monitor the Asset Inventory
Curative	
1.Hospital Based Health Care..	1. Medical Services Out-patient clinic Special Clinic Specialised Surgical care Specialised Obstetric & Gynaecology care Specialised Anaesthetic and Intensive care Specialised Paediatric care Medical Care Screening of all referral cases (local & abroad) Care and treatment of HIV/AIDS cases 2. Curative Nursing Services Midwife services Accident & Emergency nursing care Primary eye care Medical nursing care Surgical & Theatre nursing care Paediatric and neonatal nursing care Intensive nursing care Psychiatric nursing care
2. Laboratory services for clinical diagnosis	1. Analysis of specimens and reporting of laboratory results 2. Recruitment of blood donors 3. Quality assurance monitoring 4. Confirming of HIV/AIDS & STI results 5. Confirming of TB results through sputum smear examination 6. Support established surveillances including HIV/AIDS & STI, STEPS, etc 7. Research on the social and economical impacts of helminthes and filariasis on the general population.
3. Radiology services for clinical Diagnosis	1. Conduct x-ray examinations 2. Processing of x-ray films 3. Maintain adequate supply of films and chemicals for processing 4. Introduce special x-ray examinations

4. Pharmacy services	1. Procure and distribute pharmaceuticals and medical equipment to every health facilities in the country 2. Implement the National Drug Policy 3. Coordinate the supply of pharmaceuticals 4. Improve drug storage and security 5. Improve stock-taking system 6. Coordinate the maintenance of medical equipment plus other health assets
Primary and Preventative Health Services	
1. Health promotion, Nutrition Services & Disease Surveillance	1. Health Promotion Services 1.1 Advocacy on the Healthy Island Concept 1.2 Develop IEC materials to promote all health programs 1.3 Enhance advocacy on FCTC plus health policies and legislations 1.4 Conduct mass media on health matters 1.5 Submission of the Health Promotion Foundation Bill to Cabinet 2. Nutrition and Diet Services Development of the National Nutrition Policy Provide advisory services on diets of in-patients Monitor food and other supplies of the PMH kitchen Participate in promoting domestic gardening Advisory services on diets and nutritional requirements 3. Disease Surveillance 3.1 Review existing surveillance system 3.2 Coordination of response to epidemics
2. Public Health Nursing Services	1. Reproductive & Sexual Health Services 2. Maternal health services with a national cervical screening 3. Child Health Care with provisions of EPI, IMCI, Nutrition, etc 4. Prevention of STI % HIV/AIDS 5. Friendly breast feeding initiative 6. Primary Eye Care program
3. Environmental Health Services	1. Vector control through filariasis and leptospirosis programs 2. Review the Quarantine Act, Pure Food Act and other environmental health related legislations 3. Water quality monitoring surveys 4. Establish adequate water & sanitation facilities 5.Finanlizing the National Building Codes in partnership with PWD 6. Legalising the Food Safety Bill
4. Oral health Services	1. Preventative oral Health 1.1 Sealant program 1.2 National School – in – brush scheme 1.3 Outer island dental visit 2. Curative Oral Health Prosthetic dental services Dental filling and extraction

Ministry of Natural Resources and Lands

The Ministry consists of the following departments;

a) Secretary of Natural Resources and Lands
b) Agriculture
c) Fisheries
d) Lands and Survey

The Ministry of Natural Resources and Lands is represented by the Department of Agriculture (DA) on the POPs Project's NCC. DA plays a critical role in the POPs issue as it administers the Pesticide Act. The DA imports chemicals such as pesticides and fertilizers for its activities. Currently, DA does not have facilities for chemical testing and has extremely poor storage facilities for chemicals, including pesticides and fertilizers, which have been leftover from the past. Site observation of their facilities indicated that the DA is in dire need of proper storage or proper disposal of chemicals they have.

Table 13: Ministry of Natural Resources and Lands- : Output and Activities 2006

Output	Activities
Headquarters (Secretary of Natural Resources and Lands)	
1. Policy formulation and advice	1. Formulation of natural resources policies; 2. Tasks co-ordination for policy committees, taskforces and boards; 3. Co-ordination of actions needed per Cabinet decisions; 4. Evaluation and appraisal of project proposals from departments.
2. Monitoring and evaluation of sectoral programs, including the provision of support services.	1. Visits to departments including outstations; 2. Preparation of quarterly reports to DCC and Cabinet Visit to all departments; 3. Conduct of meetings with HODs on a quarterly basis; 4. Participation in meetings of committees, taskforces and boards; 5. Participation in important overseas annual or other policy meetings under the MNRE sectors; 6. Budget appraisal. Monitoring and control co-ordination.
Agriculture (DA)	
1. Policy and Advice	1.Policy development 2.Project (Monitoring & Evaluation) 3.Staff development
2. Livestock production	1.Improved pig production 2.Distribution of pigs 3.Animal health services
3. Food crop	1. Promotion organic compost

production	2. Distribution of new root crops 3. Production of planting materials and distribution
4. Pest Control and Surveillance	1. Boarder control 2. Pest Risk Assessment (PRA) 3. Quarantine Public Awareness
5 Productivity of farmers	1. Training of farmers 2. Media production 3. Awareness activities 4. Promotion of organic farming
Fisheries	
1. General Administration of the department and fisheries Policy formulation	1. Formulation of fisheries development and management policies 2. Provide scientific and technical advice on fisheries development; 3. Review fisheries manpower structure; 4. Conduct annual staff performance appraisal 5. Prepare and control the department annual budget 6. Screen all department project proposals and submission to the Ministry; 7. Monitor and evaluate all implemented fisheries development and research projects; 8. Prepare plan for staff overseas trips and training/Attachment. 9. Prepare staff annual roster and their travelling arrangement; 10. Management and operation of the department library.
2. Coordination and Monitoring of fisheries commercial development in the country	1. Coordinate and monitor the seamount fishery, tuna fishery, National fish quality control and export system, and the outer island CFCs
3. Improvement and strengthening of the fisheries database.	1. Conduct inshore fisheries resources stock assessment; 2. Conduct boat and canoe survey on all islands in Tuvalu; 3. Collect data on coral reef in Tuvalu; 4, Improve the quality of fisheries data going to the fisheries database.
4. Aquaculture & mare culture development	1. Seaweed farming trial 2. Pearl oyster Farming trial 3. Operation and management of the Giant clam Hatchery; 4. Milkfish farming trial
5. Strengthening of monitoring control surveillance & licence of foreign fishing	1.Strengthen the enforcement and surveillance capacity
6. Strengthening of monitoring control surveillance & licence of foreign fishing	1. Strengthen the enforcement and surveillance capacity 2. National Observer Programme 3. VMS Operation 4. Licensing of foreign fishing vessels
7. Operation of RV Manual	1. Carry out extension trips 2. Carry out fishing trips 3. Carry out emergency trips 4. Provide charter services 5. All crew attend STCW course at Amatuku 6. Purchase new outboard engine (30HP)
8. Maximising economic return from Foreign fishing vessel activities in the zone	1. Monitoring of access fishing agreements with Distant water fishing Nations (DWFNs); 2. Licensing of foreign fishing vessels; 3. Monitoring of catch report forms, zone reports, foreign fishing vessel activities in the zone and licence fees; 4. Established fisheries database for foreign fishing vessels and their catches; 5. Operate the National vessel monitoring system (VMS); 6. Participate during Te Matili's in-zone patrols and vessel port inspections; 7. Liaise with donor regarding surveillance requirements; 8. Implementation of Fisheries observers on foreign fishing vessels.
Lands and Survey	
1. Administration and Policy Formulation	1 Policy Advise to Ministry 2. Project formulation and implementation 3. Establishment and personnel matters 4. Programs monitoring and evaluation
2. Survey and Geographical Information System (GIS)	1. Development of a national geodetic network 2. Hands- on training for trainee surveyors 3. Cadastral, Topographical, Engineering and Geodetic and Hydrographical surveying 4. Map production and revision
3. Land & Property Valuation	1. Formulate Valuation Policy 2. Review of sublease agreement 3. Secretariat to Land Management Committee 4. Acquisition of TA to advise on rental strategies for the next review period and future rates
4. Judiciary Support (Lands Courts) and Land Information Services	1. Manages Lands Courts Activities 2. Land Resources Backup 3. Land Information Services 4. Land registration Management

Ministry of Home Affairs and Rural Development

The Ministry consists of the following departments;

a) Secretary of Home Affairs and Rural Development
b) Rural Development

c) Community Affairs
d) Women Development
e) Youth
f) Culture

The Ministry of Home Affairs and Rural Development is represented by the Department of Rural Development in the NCC to the POPs Project. The Department of Rural Development (DRD) plays an important role in POPs due to the effect of these chemicals on *Falekaupule* and their environs. This of course applies not only to the outer islands as well as to Funafuti. The other important department in this Ministry which is not represented on the POPs Project NCC is the Department of Community Affairs. This department plays a role in the dissemination of information as its mandate is "to improve the well-being of every Tuvaluan", presumably this statement may include – "*…well being from the effect of chemicals, including those of POPs*" [author's italics]. The DCA, through its activities can also promote the activities of the POPs Project or work in association with the project.

Unfortunately the Department of Culture could not assist the POPs Project simply because its mandates do not coincide with those of the POPs. The cultural aspects of disseminating information can be useful in assisting the POPs Project. Traditional practices of conservation are fast disappearing such as the use of mulching rather than fertilizers.

Table 14: Ministry Home Affairs and Rural Development: Output and Activities 2006

Output	Activities
Headquarters (Secretary of Home Affairs and Rural Development)	
1. To provide efficient staffing and financial management	1. Regular reports from heads of departments; 2. Strict control of financial expenses; 3. Implementing regular staff appraisals; 4. Regular reconciliation of vote books; 5. Formulate corporate Plan for the ministry; 6. Attentive to staff need and requirements; 7. Attentive to staff's needs and requirements
2. Smooth management of Policies - Falekaupule Act, development programmes/activities of Departments under Ministry	1. Provide advise on Falekaupule Act and other government policy; 2. Implementation of social development policy; 3. Implementation of Youth policy, 4. Formulation of cultural policy; 5. Managing and coordination of Falekaupule Trust Fund Issues; 6. Improve communication between Headquarters and all departments including all Falekaupules; 7. Develop communication strategy to access donors 8. Implement poverty reduction strategy.
3. Projects development and coordination	1. Support to Falekaupule on project development and formulation. 2. Assist Falekaupule on project implementation and monitoring 3. Support to all departments on project development and formulation 4. Explore donor support for project funding. 5. Project reporting and acquittal 6. Filing and clerical work.
Rural Development	
1Implementation and coordination of the Falekaupule program;	1. Provide technical consultancy service to Falekaupule; 2. Provision of technical assistance; 3. Formulation of policy geared for local governance; 4. Manage the overall administration of the Falekaupule Act
2. Monitoring and coordinating Kaupule development programs.	1. Provide capacity training on policy making Local Administration; Financial Management and Bye Laws formulation process for Kaupule 2. Training on project management course design to meet career development needs of the Kaupule key employees 3. Coordinate and supervise workshop for island communities.
Community Affairs	
1. Improve the well-being of every Tuvaluan	1. Production of radio programs 2. Production of at least 2 documentaries through video 3. Production of at least 3 issues of a newsletter
Women Development	
1.Tuvalu's First CEDAW Initial Report	1. To have a draft CEDAW Report for Tuvalu
2. Institution Capacity Building on CEDAW and Gender	1. Educating people on CEDAW 2. Review of Legislations in view of CEDAW
Youth	
1. Strengthening & implementing youth policy	1. Endorsement of national youth policy 2. Participation of government youth unit with island youth in implementing youth policy; 3. Seek funds for youth development program; 4. Preparation of corporate youth plan for policy; 5. Facilitate internship within the ministry of youth
2. Capacity building on communication skills among youth	1. Disseminate information about the role of government 2. Develop workshops based on component of government and other regional origin. 3. Youth opportunity to study abroad and in country training
Culture	

1. Preservation and Prioritizing Tuvalu Culture	1. Collect inputs for Cultural Policy 2. Display of cultural information in public venues 3. Promote Island significant dates in calendar year 4. Document Islands Culture Sites 5. Financial Preparation for festivals 6. Negotiate Japan Cultural Grant for Cultural Centre/Museum

Ministry of Communications and Transport

The Ministry consists of the following departments;

a) Secretary of Communications and Transport
b) Marine
c) Aviation
d) Information, Communication and Technology

The Department of Marine (DM) and Department of Information, Communication and Technology (DICT) are members of the NCC of the POPs Project. The Department of Aviation (DoA) is not a member of the PCC. The DM's shipping services are the main sources of transportation for chemicals, including POPs, which have historically entered or are going to enter into Tuvalu. While DC is proposed to be the agency responsible for identification of POPs and their stoppage at all points of entry into the country, DM can assist DC with identification since its employees could well be the first people in Tuvalu that will handle these chemicals when they come into port.

The DICT also plays an important role. POPs are suspected to be contained in many of the electronic equipment the department handles and in many cases these have become wastes. The department plays a role in identification of these equipment and where they have become wastes (as in damaged items) they need to have a disposal plan in place to eliminate the presence of POPs in Tuvalu. Apparent from the activities of DICT is the absence of an activity that deals with the disposal of damaged equipment.

Table 15: Ministry of Communications and Transport- : Output and Activities 2006

Output	Activities
Headquarters (Secretary of Communications and Transport)	
1. Formulation and Implementation of policy	1.Advise the Minister and HOD on policy matters 2.Advise the Minister on HRM issues 3.Advice the Minister on IR issues 4.Report to the Minister current and future developments of the Ministry 5.Coordinate all department's activities 6.Approve TTC's policy 7.Document policy and reports
2. Financial management and Controlling	1. Regulate all Ministry's financial spendings and revenues 2. Monitoring of ministerial budget 3. Follow up revenue collections from .TV, Air Fiji. APT 4. Monthly reconciliation of accounts with treasury
Marine	
1. Upgrading maritime administration services, law enforcement and management of services attached to it.	1.Adhering to International Conventions 2.Maritime legislation updates 3.Registration of ships 4.Registration of seafarers 5.Flag state administration 6.Port state administration 7.Maintaining the register for ships and seafarers 8.Marine radio watch keeping 9.Certification of Seaman
2. Shipping services (Nivaga II)	1. Analysis of all Ministries shipping requirements and re-scheduling to accommodate requirements. 2. Improvement of cargo passenger booking and documentation management of Nivaga II service. 3. Improvement of Nivaga's operations 4. Provision of charter services - intra/international 5. Provide charters when a need arise. 6. Maintain Class of the Vessel by continuing maintenance schedule 7. Maintenance of cargo/passenger work boat 8. Review freight and fare rates
3. Shipping services (Manu Folau)	1. As per output 2 (Nivaga II)
4. Strengthening of Port and Harbour Services	1. Loading & discharging cargo from domestic and overseas vessels 2. Upgrading of cargo handling 3. Contracting out of stevedoring 4. Restructuring the Port & Harbour 5. Hiring of cargo handing equipments to the public 6. Maintenance of port area fence and lighting posts
5. Improving & upgrading of storage facilities and distribution systems	1. Upgrading storage facilities & distribution systems 2. Implement storage fee and revise all Port charges 3. Tightening up security at wharf area
Aviation	
1. Policy advice and regulation of air services	1.Review of national aviation regulations and legislation 2.Continuous monitoring and review of air services agreement

	with airlines 3.Continuous assessment/negotiations on PIASA and Upper Air Space issues 4.Negotiate ICAO membership and comply with its standards.
2. Passengers and freight services, safety and security.	1. Customer services 2. Collection and documentation of freight charges and departure tax 3. Collection and documentation of landing and handling fees 4. IATA accreditation 5. Security of terminal and premises 6. Comply with ICAO standards
3. Air Space and Air craft Services.	1. Safety of aerodrome 2. Acquisition and maintenance of aviation safety equipment 3. Arrangement/negotiation for new traffic control tower 4. Ongoing training on civil aviation training 5. Assist police in SAR operations 6. Comply with ICAO standards
Information, Communication and Technology	
1.Administration, Policy Formulation and Project monitoring	1. Departmental administration. 2. Establishment and personnel. 3. Policy advisory role. 4. Effective project management.
2.Provision of key ICT Services	1. Information System Administration and Maintenance. 2. Database Design and Implementation. 3. Training of Government employees 4. ICT Awareness campaigns. 5. Help Desk Support Services.
3. Provision of Internet Services	1. ISP Operations 2. Outer Island Internet Link installations. 3. Internet Research. 4. Corporate Online Services

Ministry of Education and Sports

The Ministry consists of the following departments;

a) Secretary of Education and Sports
b) Education
c) Primary Education
d) EFL Secondary Education
e) Library
f) Sports
g) Pre-service

Among the suggested strategy action plans for the implementation of the Stockholm Convention is the strategy 1, which includes - *Strategy for Information Exchange, Public Information, Awareness and Education (Articles 9 and 10)*. In all the suggested strategy action plans, education is the key; that educating everyone in Tuvalu about POPs, about what GOT is doing about POPs, about what others are doing regarding POPs is probably the single most important way in which the public is to be informed, made aware, and be "educated" about POPs.

The work of the departments of Library, Sports and Pre-service is not so relevant to POPs. While "Education" deals with the day-to-day management of the education system, this particular department can assist in educating the public by ensuring that issues of the environment, including chemical effect and POPs, become part of the curriculum in the Primary Education and the EFL Secondary Education departments. It is not advocated here that educating the public is of course not the sole responsibility of the Department of Education or of its other sections. Educating the public is a joint responsibility between all stakeholders to ensure the issues, problems, etc., are disseminated to the public, including the decision-makers. The importance of "education", "awareness" about environmental issues is eloquently put in the NEMS;

> "Without greater awareness among the public, and hence the decision makers, of the environmental challenges facing the nation [*Tuvalu*] and of possible alternative approaches for meeting those challenges, the improvement of environmental management will be most difficult. Achieving ecologically sustainable development will be similarly difficult.
>
> Indeed education is the key to improving environmental conditions in Tuvalu. Human actions, mostly carried out in ignorance or without a full understanding of the consequences, are the principal cause of almost all the environmental issues discussed in this report [*the NEMS*]. Undertaking environmental protection programmes which are not backed by public education may solve an issue today but will not prevent its reappearance tomorrow." (Wendt and others, 1997, p20).

Table 16: Ministry of Education and Sports- : Output and Activities 2006

Output	Activities
Headquarters (Secretary of Education and Sports)	
1. Education and Sports policies Advice	1. To fulfil cabinet and parliamentary commitments 2. Formulation of Education & Sports policies including appropriate reform. E.g. the Education and Training Sector Master Plan (ETSMP) 3. Improve co-ordination of functions and activities. 4. Restructuring of staff within the department. 5. Representing government to regional & international meetings.
2. Financial and management services.	1. Ensure that the Budget is well controlled. 2. Recruitment of Financial officers to assist the HEO 3. Control management Ministry's supplies and resources.
3. Effective co-ordination and monitoring of UNESCO activities.	1. Co-ordinating and Monitoring of all UNESCO approved projects. 2. Follow-up on UNESCO related matters. 3. Submit acquittal report of all projects at the close of each project. 4. Participate in UNESCO meetings and conferences.
4. Support to the Tuvalu Language Dictionary	1. Production of one monolingual dictionary in Tuvaluan; 2. Production of two bilingual dictionaries in Tuvalu & English; 3. Production of Tuvaluan grammar; 4. Translation of the Tuvaluan grammar into English; 5. Providing guidance on linguistic matters and translation of words.
Education	
1. Improve the quality and efficiency of management.	**1. Strengthening structure and management processes** 1.1. Review of roles of DoE staff 1.2. Provide extra DoE positions: ECE; TVET & Curriculum
	2. Research, Policy Development, Planning and Management 2.1. Prepare a new Education Policy Document 2.2. Prepare policy advice and information papers for the Minister of Education 2.3. Review and formulate education policies and operational policies and align these with new developments e.g. CRC, CEDAW … 2.4. Review and formulate strategic plans including the annual DoE corporate plan, EFA Action Plan, SPBEA Annual Work Programme 2.5. Improve the Education information system database; 2.6. Monitor, evaluate and formulate education project plans, including donor funded projects 2.7. Monitor, support and evaluate all DoEs staff and outputs
	3. Educational Personnel Management Improve and implement policies, management systems and procedures for hiring, posting, and transferring educational personnel; Train DoE staff, Principal of MSS and Head teachers of primary schools in the use of revised policies and procedures; Monitor and improve the management system and procedures for assessing performance in the classroom
	4. Organisation and Administrative Management: Strengthen national coordination of ECE activities Improvement of school administration Creation and strengthening of information system Strengthening of national education boards
2. Improving the quality of teaching and learning processes.	**2.1. Relevant Curriculum and teaching materials:** 2.1.1 Develop and implement curriculum documents and resource for pre-schools, primary, secondary and post-secondary to align with the National curriculum Framework; 2.1.2 Plan and deliver teacher in-service training programmes; 2.1.3 Provide professional advice to teachers; 2.1.4 Produce and print educational publications; 2.1.5 Procurement of goods and assets for the DoE, and schools;
	2.2 Assessing learners' achievement: 2.2.1 Publication of Education Statistical Digest 2.2.2 Internal Assessment profile for primary and secondary level. 2.2.3 Review and development of secondary school subjects prescription 2.2.4 Academic school calendar. 2.2.5 Production and monitoring TUSTA 4 , 6 and Year 8 NYE. 2.2.6 Review Year 8 prescriptions. Verification visit. 2.2.7 Implementation of AFL with support from SPBEA 2.2.8 In-country workshop on AFL. Develop primary outcome resource tool. 2.2.9 Development, moderation, reproduction and administration of National Examinations – NYEE and TSCE 2.2.10 Marking and Analysing results for NYEE and TSCE 2.2.11 Co-ordination and administration of FJCE and PSSC (National agent) 2.2.12 MSS accreditation assessment policy for all levels. 2.2.13 AGM – SPBEA/ACEAB
	2.3 Monitoring and improving standards: 2.3.1 Promote more effective teaching 2.3.2 Train teachers in AFL [outcome-based curriculum]; 2.3.3 child-Centred; Capacity building workshops for ECE teachers; 2.3.4 Instructional practices all sectors 2.3.5 Development of pedagogic support 2.3.6 Improve in-school supervision: circuit supervision and Head teachers 2.3.7 Prepare a sustainable in-service training system; 2.3.8 Conduct research into national needs & issues 2.3.9 Improve learning environment

	2.3.10 Partnership between schools and their island Kaupules 2.3.11 Create and implement school improvement plans 2.3.12 Improve supply and distribution of learning materials 2.3.13 To monitor minimum standard requirements for school buildings, facilities and equipment 2.3.14 Support greater community involvement in school improvement 2.3.15 Public awareness and education of current initiatives; 2.3.16 Community support strengthened to support all sectors; 2.3.17 Participation of communities in the design, implementation and monitoring of education goals supported
3. Improve relevance and responsiveness to all educational endeavours	Skills Development Take account of TVET providers Review of programmes on TVET; establish links with COL & other international providers; Adapt programmes on TVET to suit national realities; concentration with enterprise; Create administrative structure to manage TVET and Continuing Education; Life –skills programme [UNICEF]; Other Challenges: Fight against HIV /AIDS Health and Nutrition measures CRC Promotion of peace and Tolerance (Associated School Project, UNESCO)
Primary Education	
1. Effective implementation of primary school policies and programs	1. Ensure schools are well staff 2. Ensure that school receive adequate school supplies requirement 3. Ensure school facilities meet minimum health standards 4. Co-ordination of curriculum and professional development in areas requiring reviews
2. Management of school resources	1. Timely ordering of school supplies with either local or overseas suppliers 2. Management of school supplies and equipment
3. Strengthening of Primary School standards	1. Liaison with School Committee on school needs and requirements 2. Co-ordinate and monitor production of schools base assessment tools, marking and reporting to parents. 3. Assist in the administration of the PILLS Test. 4. To implement and review of educational policies 5. Co-ordinate, monitor and report appraisal of XB and local based projects
EFL Secondary Education	
1. Effective implementation of Secondary Schools policies and programmes	1. Implementation of prescribed curriculum, assessment Instrument and standards. 2. Co-ordination placement and recruitment of quality staffing before start of academic year 3. Monitor and coordinate adequate 4. Monitoring of students conduct
2. Monitor support services (staffing and educational facilities)	1. Timely recruitment's of school support staffs 2. Termly reports on staff performances to Head Office 3. Maintenance of school rules 4. Renovation works to school facilities and staff houses.
3. Strengthening of schools standards	1. Monitor school standards according to prescribed curriculum 2. Co-ordinate the timely production of department school based test, CATS, of the TSC and PSSC 3. Assist in the production of the National 8 examination paper. 4. Co-ordination of the Administration of the FJC,TSC, and PSSC examinations in November 5. Review of prescription 6. Professional developments of teaching skills and methodologies.
Library	
1. Information services to the Public, including researchers	1. Upgrade and Maintain collection 2. Upgrade library services to the Public 3. Preparation of exhibition and display 4. Computer cataloguing
2. Archives Services to Government & Community.	1. Indenting of Archives materials 2. Preservation of archives 3. Affirm the importance of archives 4. Microfilming of fragile records. 5. Develop Archives facilities in terms of preservation storage and work areas. 6. Digitise records in archives to enable electronic use. 7. Develop a records management programme.
Sports	
1. Effective implementation of the National Sports Policy and Development programmes in the grass root level	1. Sport Policy 2. Hosting & organising National Sports Events for school children and for adults 3. Physical Education (PE) program in schools
2. The establishment of Sports Infrastructures on the outer islands and on Funafuti	1. National Sports Field 2. National Gymnasium 3. Multipurpose Out-door courts
Pre-service	
1. Selection of qualified candidates to	1.Securing of students placements and funding. 2.Maintain students welfare

appropriate award and placement	3.Monitoring student progress

2.2.3 Relevant International Commitments and Obligations

Tuvalu membership in international organisations is summarised in *Table 17*, followed by information on participation in relevant international agreements in *Table 18*. The Department of Foreign Affairs is often the official Focal Point for many of these organisations. The agencies indicated in *Table 17* are those most involved at the operational level.

None of the international agencies shown in the table have offices in Tuvalu. Two of the regional agencies (SOPAC and SPC) are in Fiji, while FAO and SPREP have offices in Samoa while SPC has an office in New Caledonia.

Table 17: Membership in Relevant International Organizations, Programmes and Bodies

Organisation	National Contact	Related National Activities/ Programmes
FAO	Agriculture (DA)	Pesticide legislation, IPM practices, agricultural production
IFCS	Environment (DE)	National Profile, chemical information networks
IPCS	Environment (DE)	Supply of Environmental Health Criteria documents, etc
UNEP	Environment (DE)	POPs project, training in ODS management
UNDP	Office of the Prime Minister (OPM)	Adaptation to climate change, environmental vulnerability, National Capacity Assessment, sustainable development
WHO	Health (MH)	Health sector training, primary care, health promotion, disease surveillance, water quality, medical waste, food safety
SOPAC	OPM	Wastewater, renewable energy, disaster management, GIS
SPC	Agriculture, Health	Pesticide legislation, International Pest Management (IPM) practices, agricultural production
SPREP	Environment (DE)	POPs disposal, Waste Management

Table 18: Participation in International Agreements/Procedures Related to Chemicals Management

Agreement/ Convention	Tuvalu Status	Implementation Activities
Agenda 21 – Commission for Sustainable Development	Endorsed	Development of Environment Management Act and national waste strategy (+ many other broader actions)
Basel Convention	Not a Party	See Waigani Convention below
Chemical Weapons Convention	Party	No specific activities
ILO Convention 170 (Chemicals)	Not a Party	Principles incorporated into OHS Act and regulations
London (dumping) Convention	Not a Party	Tuvalu is a member of IMO
Rotterdam Convention (PIC)	Not a Party	Principles recognised in proposed new Pesticides Bill
Stockholm Convention (POPs)	Party	Development of National Profile of Chemical Management and the National Implementation Plan
Montreal Protocol (ODS)	Party	ODS Act and national implementation programme
SPREP Convention (Environment)	Party	Coastal management, waste management, climate change and other environmental management activities
Waigani Convention (Hazardous Waste)	Party	Development of national waste Management strategy, participation in POPs disposal project.

2.2.4 Existing Legislation and Regulations Addressing POPs Chemicals

There is currently no legislation in Tuvalu that has the potential to provide controls across the full life cycle for POPs and other chemicals, including import and production, storage, handling and use, and final disposal. The following Acts are included herein for their potential to be used to regulate POPs.

However, this report has identified several laws of Tuvalu that are relevant to the current Health and Environmental concerns about POPs. The below listed

laws may in some limited capacity be able to place restrictions or prohibition to the use of POPs in Tuvalu.

As of January 2007, the laws are:

i. Public Health Act 1926 (Cap. 35) & Public Health Regulations 1926;
ii. Petroleum Act 1968 (Cap. 42);
iii. Falekaupule Act 1997;
iv. Merchant Shipping (Oil Pollution) (Tuvalu) Act 1975 (Cap. 64A);
v. Marine Pollution Act;
vi. Harbours Act;
vii. Pesticide Act 1990 (Cap. 39A);
viii. Customs Act (Cap. 55); and
ix. Quarantine Act.

Analysis of the Identified Relevant Laws of Tuvalu Related To POPs

Public Health Act 1926 (Cap. 35)
Commenced 01 December 1926
Chapter Cap 35

In relation to stockpile, the Public Health Regulations requires all premises and land to be kept clean [reg. 2]. The implication of the above law may advocate that it is an offence under the Regulation for waste material such as POPs to be left idle on any land or premises. However, the penalties under the Regulation do not justify the likely impact of POPs on human health and therefore is irrelevant and need revision.

It is noted that the Regulation applies mainly to infectious diseases. It would be necessary therefore to consider whether the POPs affected illness could be classified as an infectious disease, considering in particular the importance of its impact.

The objective of the Ordinance is in "protecting and advancing the public health of Tuvalu" (section 3). The Ordinance provides a general framework for the management of all matters relating to public health, food and water supply, sanitation and waste disposal. Specifically, section 3 calls for the following areas; (a) Latrines, dustbins and rains (b) Scavenging, cleaning and disinfecting and (c) Removal and disposal of night-soil and house refuse. It is apparent from the date of the Act that it needs to be expanded/ revised/updated to suit today's social and economic environment.

Administratively, the Act is administered by the Director of Health at the operational level, although the Minister is ultimately responsible and issues regulations from to time to time. Regulations under the Act include the following;

1. No person shall deposit or cause to be deposited any empty tin, bottle or other receptacle in any street, road or other public place
2. Every house or building in daily occupation shall be provided by the owner hereof with latrine accommodation as approved by a sanitary inspector
3. (a) latrines shall be kept thoroughly clean
   (b) occupiers of houses and buildings shall immediately report to the sanitary inspector should the latrine pans at their houses or buildings not be removed daily.
4. A sanitary inspector may order the destruction without payment of compensation of any latrine which is, in his opinion, unfit for use, and a latrine approved by him shall be thereupon be provided by the owner.
5. All garbage and other rubbish which can readily be destroyed by fire shall be so destroyed; and all other garbage and rubbish shall be placed in tins and covered with fly proof covers, and such tins shall be placed daily in positions convenient for collection.
6. Penalties for non-compliance with the regulations are:
   a) $20 or one month imprisonment for first offence
   b) $50 or three months imprisonment for second and subsequent offences. (Section 3(2)).

The Act has the following regulatory Schedules/ Regulations;

- Declaration of Sanitary District under section 2 and
- Public Health Regulations under section 3.

Regulation 28 of the Act affects physical planning and in general health in that it requires poultry farms to be located at least 200m from any house.

The Act establishes the Public Health Committee, which is chaired by the Director of Health. The Committee consists of six members appointed by the Minister of Health. The committee exercises general powers of supervision over environmental health matters on all the islands. On each of the islands the committee is represented by the resident nurse assisted by selected members of a committee often consisting of island individuals of respectable standing.

While the Act does not address POPs, these chemicals can be addressed through a Regulation announced by the Minister.

Petroleum Act 1968

This Act applies only to Petroleum but where necessary the Minister may by notice extend the relevant POPs that fall under inflammable substances. That is, it would be important firstly to identify POPs that are bound to fall under the category of inflammable substances and then for the Minster to make the notice.

The importance of this Act is that once the Minister classes the POPs as an inflammable substances, section 7 provides that it must be stored separately and distinctively marked. Also, it allows for the Inspector of Petroleum to control the sitting of facilities and imposes a form of planning control.

Falekaupule Act 1997

The relevance of this Act is that it gives the Falekaupule autonomous powers to make byelaws for the areas within their jurisdictions that may have direct relevance to the banning, use, limiting the stockpile, or/and restricting the production of POPs.

Merchant Shipping (Oil Pollution) (Tuvalu) Act 1975 (Cap. 64A) & the Marine Pollution Act

The noted laws are important as they provide uniform rules for dumping/discharge and escape of oil for the former Act and for the latter any waste at sea.

The defect of the Merchant Shipping (Oil Pollution) Act is that it applies only to oil discharge whereas under the Marine Pollution Act provides one of the defences for discharging waste at sea is for safety reasons and that this was a reasonable step to take. The discharge of POPs at sea may be classified as an offence under the Marine Pollution Act otherwise it is also an accepted defence for safety reasons.

Harbours Act

It is an offence under section 44(i) to throw anything into the harbour or to allow it to fall in, whether from the land or a vessel. Objectively, this may apply to any equipment or substances that contain the POPs.

Pesticides Act 1990

Commenced 01 January 1991
Chapter Cap 39A

Section 7(2) of the Act prohibits any person to import any pesticide unless it is registered. Pesticide is defined (section 2) to mean any substance or mixtures of substances used or intended for use for the following:

- to prevent, control or destroy any pest; or
- to regulate plant growth, or as a defoliant or desiccant or as an agent for thinning or preventing the premature fall or fruit; or
- by application before or after harvest, to preserve crops from deterioration in their condition during storage or transport; or
- any such substance or mixture of substances declared by the Minister under section 7(3) to be a pesticide.

The Act is administered by the Director of Agriculture at an operational level. The Minister of Natural Resources and Lands Survey is ultimately responsible for the Act. A Pesticides Committee, with the Director as Chairman is established under the Act and its purpose is to assess applications made to the Registrar to register pesticides. The Committee consists of the following members (a) Agricultural Officer (Chairman), (b) a Public Health Officer and (c) a representative of pesticide importers, suppliers and users appointed by the Minister under section 5. The Committee has the following powers, it may:

1. Direct that the pesticide may not be registered for a period of 5 years;
2. Determine the conditions as to the importation, transportation, storage, distribution, sale, supply, use and disposal.
3. Defer consideration pending sufficient information from the applicant or decline the application all together.
4. Deny an application in the following instances;
   a) the Committee considers that there is no need for the pesticide in Tuvalu
   b) or the continued use of the pesticide is ineffective
   c) or the use of the pesticide would give rise to an unacceptable hazard to the people and environment of Tuvalu
5. Where the above conditions [4(a) to 4(c)] apply to a registered pesticide, the registration will be cancelled or suspended (section 8(2)).

The Acts requires that registered pesticides should not pose any greater risks than newer pesticides and that older pesticides are expected to meet the current standard expected for the registration of new pesticides.

Under section 7(3), the Minister may from time to time on the advice of the Pesticides Committee by order declare that any substance or mixture or class of substances is deemed to be a pesticide by its common or trade name, by a description of the class or by its toxicological action, its use or intended purpose. The duties of the Registrar (Chairman of the Committee) are to maintain a Register of Pesticides and regulate the importation of pesticides.

The Minister may, under section 7(3) of the Act, declare any of the listed or relevant POPs not yet declared as a pesticide. Accordingly, it would be placed under the stringent measure and control procedure under the Act, which is dealt with by the Pesticides Committee (see section 8 for Responsibilities of Committee).

Customs Act

Section 34 of the Act provides for the Minister to declare by Order prohibited and restricted imports to Tuvalu. This section is vital because it makes a good source for monitoring the goods that are likely to enter Tuvalu by the customs department and as such, the listed and identified POPs can be classified as prohibited and restricted imports. That is, it would either be totally banned or restricted from entering Tuvalu.

The one identified weakness of this procedure is that the listed POPs are identified or found under different sources/equipment, e.g. DDT found in pesticides, and or PCB in electric transformers, etc. Therefore, all concerned stakeholders should ensure that the Minister is properly informed to make a sound judgment to ensure that the right sources or equipments are identified.

Quarantine Act (Cap. 34)

This Act imposes measures for the inspection, exclusion, detention, observation, segregation, isolation, protection, treatment, sanitary regulation and disinfection of vessels, persons, goods and things and having as their object the prevention of the introduction or spread of diseases or pests affecting man.

The Act is only aimed at overseas vessels entering Tuvalu with persons or goods infected with quarantinable disease or have been in contact with, or exposed to infection from, any person or goods subject to quarantine. “Quarantinable disease” means smallpox, plague, cholera, yellow fever, typhus fever or leprosy or any disease declared by the Minister by order to be a quarantinable disease. This Act may only be relevant to POPs if a POPs-related disease is infectious and have been declared by the Minister by order to be a quarantinable disease.

Environmental Protection Bill

The Environmental Protection Bill was finalized and passed by Parliament in June 2008.POPs issues could be forwarded to be addressed under this law attempting to legislate all general issues connected with the protection of the Environment.

Pharmacy and Poisons Act 1926

Commenced 02 August 1949
Chapter Cap 33

This Act covers the registration of pharmacists, control of the practice of pharmacy, and the distribution and sale of pharmaceuticals and poisons. The chemicals covered by the term "poisons" are given in a Schedule 2 of the subsidiary legislation under section 49 of the Act, and cover a wide variety of different substances.

The Act is administered by an inspector nominated by the Minister. Licences are required for the importing of poisons and medicine. There are significant overlaps between this Act and the Pesticides Act in the area of pesticides.

This Act can also be used to address the issue of POPs as POPs can be considered poisons. In this case they can then become regulated as poisons through the normal procedures of the Act.

2.2.5 Relevant development strategies, policies and plans

2.2.6 Key Approaches and Procedures for POPs Management

The primary mechanisms for controls on the imports and use of POPs pesticides is through the Pesticides Act. Imports of POPs pesticides have been banned under this Act. Monitoring and enforcement of these bans depends initially on the Department of Customs, although the various field officers in Agriculture and Customs will also have a part to play in identifying any illegal uses.

The import and export of other POPs (PCBs) through transnational shipment is currently covered under the Waigani Convention and through identification of these by the Customs staff.

However, the identification of these POPs at the point of entry has proved difficult because of untrained officers.

There is currently no formal system for the control of exports of POPs chemicals, except when these are to be exported as wastes. In that case the approval procedures associated with the Waigani Convention (the regional equivalent of the Basel Convention) come into effect, and these are currently administered by the DE.

Releases of unintentional POPs are currently not covered under any of the legislations, but one of the primary causes is incineration and this is addressed under solid waste management.

A summary of the chemical management resources available in the key agencies is given in *Table 19*. It should be stressed that this relates only those people directly involved with chemical management in their respective key agencies.

There are staff in other agencies with relevant functions, but these are usually delivered as part of a much broader range of control activities (e.g. Customs Officers, Agriculture Extension Officers, Medical Officers, Public Health Nurses, and Health Inspectors).

Table 19: Key Resources Available in Government Ministries/ Institutions

Agency	No. of Professional Staff[13]	Activities and Expertise

[13] "Professional Staff" in this case refers to officers who have, in addition to their particular area of expertise such as doctors, lawyers, fisherman (as in the "Fisheries"), surveyors, etc., they also have intricate knowledge of chemical management either through additional tertiary qualification(s) in a chemical related discipline or by experience or both. Such professional staffs are in unique positions, in their own

Agency	No. of Professional Staff[13]	Activities and Expertise
Agriculture	2 Plant Protection Officers	Pesticide trials and registration, qualifications in science, and especially entomology.
Environment	9 Project Officers[14]	POPs Project, ODS, waste management, qualifications in science/environmental science
Health	3 Health Inspectors	Public Health activities; qualifications in science and/or Environmental Health
Occupational Health & Safety	none	Technical advice, monitoring, standards development, engineering/science degrees plus specialised OHS training

As indicated in the table, the resources available for chemical management are currently very limited, especially in the area of enforcement. Much work remains to be done in the preparation of guidelines and standards, and in developing a much wider knowledge and understanding throughout the population, of the obligations under the Pesticide Act and the Waigani Convention. There is also a need for significant additional efforts in the area of monitoring, enforcement and advisory activities in support of the Pesticides Act and of provisions in the Waigani Convention.

2.2.7 Environmental Overview

The low-lying atoll islands of Tuvalu are susceptible to storm surges and the sea level rise[15]. They also have very limited arable soils capable of supporting intensive agriculture.

departments, to assist the responsible GOT agency for the management of chemicals. For example a lawyer with extensive experience in chemical management is a "professional staff" in this sense because he/she can readily assist in the matter of chemical management in such issues as drafting a legal document quickly to cater for a particular chemical management issue. On the other hand, a lawyer without such expertise will not be considered to be a "professional staff" in this sense due to his/her incapacity.

[14] The officers include those in the POPs Project (3 officers), International Waters Project (1 officer), Waste Management Project (1 officer), the Ozone Depleting Substances Project (1 officer) and the DE administration (3 officers) – totalling 9 officers. The officers in projects are on contract basis and their long term involvement with the DE is unknown at the time of preparing this NIP.

[15] While there is still speculation whether there is scientific proof of sea-level rise, it is happening in Tuvalu.

Tuvalu has a tropical maritime climate with plentiful rain. It is subject to potentially catastrophic climate events such as cyclones and tidal flooding, which can have a major impact on the economy and infrastructure. There is a relative abundance of annual rainfall that generally ensures good supplies of water on the islands. However, these have to be stored as there are no river systems. During El Nino periods the islands can suffer from serious drought.

A general framework for environmental management in Tuvalu was introduced in 1997 through the National Environment Management Strategy (NEMS). The NEMS was supported by a State of the Environment Report (SOE), which involved an extensive assessment of all natural resources in Tuvalu, their utilisation and development, and the associated problems, such as pollution and land degradation. The NEMS[16] identified the following environmental issues as being of major significance:

- Global warming and sea-level rise and impact on ground fresh-water supplies;
- Ground water depletion and pollution;
- Over-fishing of reefs and lagoons and unsustainable rates of gleaning of inter-tidal reef flats;
- Garbage and sewage disposal;
- Coastal erosion;
- Shortage of firewood;
- Loss of knowledge and application of traditional subsistence production systems which effectively conserved resources; and
- Deficiencies in environmental education and public awareness.
- The inability of GOT to manage national resources on a sustainable basis because of inadequate policies, legislation, forward planning and administration;
- Deficiencies in physical planning are being compounded by significant urban drift and migration from the outer islands resulting in uncoordinated

[16] Wendt, Neva., and others, 1997, *Tuvalu: National Environmental Management Strategy*, South Pacific Regional Environment Programme, Apia, Western Samoa; p18- 26

development, which leads to significant environmental and social problems; and

- Heritage and biodiversity values are inadequately appreciated while losses are increasing through ill directed development activities and lack of management and knowledge.

2.3 Assessment of the POPs Issue in Tuvalu

Section 2.3 provides a summary of the current state of knowledge about POPs chemicals in Tuvalu. It is based on various preliminary inventory studies carried out during background information collection stage of the Enabling Activity for the POPs project. These include preliminary inventories on: pesticides; PCBs; unintentional POP and doxins and furans. These were previously reported in a number of project documents, which are referenced as in the text and included as Annex 4 to the NIP. During the inventory studies DE staff visited Niutao, Nanumea, Nanumaga, Nukufetau, Nui, Vaitupu, Nukalaelae, Nuilakita and Fongafale.

The Australian Government funded Persistent Organic Pollutants in Pacific Island Countries Project also addressed the issue of POPs in Tuvalu. The activities of the Project, which visited Tuvalu in 2003, 2004 and 2005, were limited to the main island Fongafale. The first phase of the POPs in PICs Project was implemented by SPREP in 2003 and developed a preliminary inventory for the second phase of the POPs in PICs Project. Work was limited to Fongafale as there was no information indicating the presence of discussed pesticides on the outer islands. There was some information on the existence of transformers on Vaitupu islands, but these were established to be modern transformers. The POPs in PICs Project activities are further described in Section 2.3.3.

2.3.1 Overview of Technical Capacity and Infrastructure for POPs Management

The extent of technical resources available within government agencies for the management of POPs and other chemicals was summarised previously in *Table 19*. However, it should be recognised that this is simply an indication of the **potential** resources, as most of these people would have numerous other duties as well.

Other regional organisations with relevant expertise are SPREP, SOPAC and SPC to which Tuvalu may refer specific cases for consultation. Tuvalu, in the POPs Project, has used these services including services provided the Institute of Applied Science of the University of the South Pacific located in Suva, Fiji and SPREP officers.

The technical infrastructure for POPs management in Tuvalu is non-existent. There are no specialised facilities for the handling, storage and transportation of hazardous materials, and none for the treatment and disposal of hazardous wastes. The closest available laboratory with the capability for POPs monitoring and analysis (pesticides and PCBs) is the Institute of Applied Science at the University of the South Pacific located in Suva, Fiji, which is both being used by the POPs Project and the Public Health Department in the Princess Margaret Hospital.

2.3.2 Assessment with Respect to Annex A, Part I Chemicals (POPs Pesticides)

Annex A Part I requires the elimination of the following POPs; aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene and PCB. The assessment in this section applies to all with the exception of PCBs. PCBs are addressed in 2.3.3.

There is no evidence of any current trade by Tuvalu in POPs chemicals. The POPs pesticides known as HCB *(benzene hexachloride)*, chlordane, dieldrin and DDT were previously approved for use in Tuvalu but there is no information available on the quantities that were used in the past. These registrations were withdrawn some years ago, and pesticides were formally withdrawn from use in 1995 upon a recommendation from the SPC that biological agents be used instead to target the specific pest to be eliminated. Pesticide use not only eliminates the targeted pest but also other biota which are useful to the environment such as in the case of pollination.

The Preliminary Pesticide Inventory undertaken in November 2005 conducted through the POPs projects enabling activities investigated POPs and other agriculture chemicals, in Fongafale and Vaitupu. The methodology involved an interview and questionnaire with key Department of Health and Department of Agriculture. Visits were also undertaken to chemical storage sites including:

- Agricultural Department Funafuti
- Vaitupu Agricultural Research Station
- Public Health Deaprtment (Princess Margaret Hospital)
- Tuvalu Cooperative Society (TCS)
- Taiwan Project

Investigations in Funafuti indicated the Agricultural Department is no longer importing pesticides or insecticides due to financial constraints. They rely on chemicals supplied by the Public Health Department when the need arises. Investigations at the Funafuti Agricultural Store indicated that the Agricultural Department keeps various stocks of chemicals in the building opposite the wharf. These chemicals are used when necessary and include:

- Bactromat (M-E)
- Ethylactate (500mL)
- CAPTAN (150gm)
- Pro Gib Plus (150gm)
- Blitzem (500gm)
- Insect trap coating (156gm)
- Methyl Engenol (1Kg)
- Cuelure (1 Kg)
- Lane Ranger Insecticides (600gm)
- Rat bait

Investigations at the Vaitupu Agricultural Store (Elisefou) identified disused chemicals stored in inappropriate packaging, leaking on to the floor of the shed. According to anecdotal evidence collected at the site, the chemicals have been in Elisefou for 17-20 years. The chemicals are not scheduled POPs, but are pesticides that are both organic and persistent. They include:

- Diazinon 20P
- Malathion
- Stresnil (neuroleptic injection for pigs)
- Terramycin (antibiotic for animal treatment)
- Ficam (insecticide)
- Oxytocin
- Tricin
- Iodine tincture
- Celcure Tricunolec (wood preservation, Organo in copper naphthenate

Soil samples were collected from the site, but not analysed. This site is considered to be potentially contaminated. A site photograph is included in Annex 6.

The survey also noted various (non-POPs) pesticides in use at the Public health Department, the Marine Department and the Tuvalu Cooperative Society. The Taiwan Technical Mission also had some chemicals. Anecdotal evidence from staff indicates they have some stocks of malathion, that they are not using as they consider it too dangerous.

The investigations noted the following concerns over pesticide management:

- Concerns about the quality of some formulated products;
- Diluting and decanting (rebottling) of formulated products;
- Unknown imports of pesticides;
- Improper storage and disposal facilities at the user levels;
- Poor handling practices at the user level;
- Absence of OHS practices;
- Lack of technical training at all levels;
- Inappropriate or inadequate information in Material Safety Data Sheets; and
- Poor post-registration surveillance.

The above issues were also reflected in a recent survey of chemical awareness levels[17], which ascertained that there were significant concerns among the public about practices in chemical storage, handling, use and disposal, mostly at work.

The available information on environmental distribution and fate of POPs pesticides in Tuvalu is extremely limited. Clearly, there is no need for Tuvalu to register for any of the possible exemptions under the Stockholm Convention, for continuing use of Annex A, Part I POPs pesticides. Imports of pesticides have been withdrawn from use under the SPC project, as mentioned earlier. Thus imports of all nine of the POPs pesticides have already been restricted under the same project but this does not cover all possible use situations. The recommendation by SPC was specific to Nanumaga and Vaitupu where the *manu kai niu*[18] ("coconut scale") is prevalent. The withdrawal from use of pesticides is only for these two islands. As can be seen in 2.3.4 DDT has been replaced by other pesticides such as malathion and temphos. These are however not imported by the DA but are donations to the Environmental Health Services in the Ministry of Health by international organizations such as WHO.

The various surveys noted above, along with the limited environmental data, indicate a need for much better recording, monitoring and enforcement of the current controls over POPs and other pesticides. This would include capacity building for the Customs agency, for better enforcement of import restrictions and detection of illegal imports, if any.

The above information also indicates the need for building capacity in the safe storage of chemicals. In the case of Vaitupu, the chemicals have been stored for nearly 20 years, are not used and may be contaminating surrounding areas. These chemicals should be disposed of or safely repackaged and the surrounding area investigated for contamination.

2.3.3 Assessment with Respect to Annex A, Part II Chemicals (PCBs)

The methodology for the assessment with respect to PCBs was informed by previous studies. In 1998 SPREP revealed over 8,000L of potentially PCB-contaminated oil. According to the report there were 25 potentially contaminated transformers as well as various drums of potentially PCB-contaminated waste oil. In 2002 the Tuvalu Waste Trends and Targets report reported several PCB-contaminated transformers as well as the presence of PCBs in groundwater at the Power Station. Further work indicated that this report used field test kits. Inorganic chloride salts in seawater may produce false positive results in oils as no extraction is performed on these samples.

Phase I of the POPs in PICs Project undertaken by SPREP in 2003 and 7 stockpiled transformers and switchgear units at the Tuvalu Electricity Cooperation (TEC) were tested with Dexsil field test kits. Field test kits are used as a quick way to assess if PCBs may be present. The Dexsil kits test for all chlorine and not just chlorine in PCBs, so they are susceptible to "false positive" results. Samples of oil from transformers where positive results are indicated are extracted and sent to the laboratory for analysis. The results of the samples seven samples tested under POPs in PICs were that one was considered contaminated, with a PCB concentration greater than 50ppm. The oil and the transformer were collected under the POPs in PICs Project in 2005. The oil in three of the transformers had concentrations less than 50 ppm and were therefore not collected under the POPs in PICs Project. No PCB concentrations were detected in the remaining three transformers. Phase I also identified six tonnes of waste oil stored in a tank at the back of the power station.

Oil in 11 online transformers and switchgear units were not tested during Phase I. In 2003 the POPs team left funding with the Ministry of Environment, Energy and Tourism (MEET) to have all the in-service units (11 transformers and 11 switchgear units) field tested during the next long power shutdown, and then to send samples from the "positive" units to New Zealand for analysis. It is understood that the field testing was carried out, but the samples were never sent for analysis. POPs in PICs Phase II did not test online transformers or

[17] Niuatui, Lomiata., 2005, Review of the Administrative, Institutional and Technical Infrastructure, POPs Project Enabling Activity, Department of the Environment.

[18] The scientific name of the organism is *Aspidiotus destructor*.

switchgears. To characterise the potential for remaining PCBs in Funafuti these transformers and switchgear units should be tested.

Under the investigations for the NIP on Fongafale, interviews, questionaries and site visits were undertaken. Site visits were made to: Tuvalu Electricity Cooperation; BP; Tuvalu Cooperative Society; National Fishing Cooperation; the Public Works Department; and the Tuvalu Maritime Training Institute.

At TEC it was also observed that waste oil was leaking into the ground where these drums were stored. It was concluded that there is a high possibility that PCB contamination of soil has occurred.

Investigations also indicated there are seven unused transformed on the island of Vaitupu. Anecdotal evidence from discussions with TEC staff indicate these are new transformers and therefore very unlikely to contain PCB-contaminated oil.

Due to the lack of Dexsil test kits, the 11 online transformers and switchgears were not tested under the NIP investigations. The main issues that Tuvalu needs to address in relation to Annex A, Part II chemicals are the testing of online transformers and switchgears for PCBs and the development of a system for the identification and environmentally sound management and disposal of capacitors and other small items of electrical equipment potentially contaminated with PCBs.

No specific regulatory actions have been taken in Tuvalu for the removal and disposal of old electrical equipment containing PCBs, such as capacitors used in fluorescent lighting ballasts. There is no data available on the extent of this possible source.

There is also a need for strengthening of the Department of Customs to ensure that future imports of PCBs, if any, are identified and stopped at the border. The current system to control export of PCBs is the Waigani Convention. This has been demonstrated in Tuvalu by the recent success in taking a PCB-contaminated transformer (from TEC) out of Tuvalu to Australia for destruction. This system/ control mechanism needs to be strengthened and the process widely communicated so more people/ departments are aware of its existence. The Rotterdam Convention on Prior Informed Consent ensures countries are informed of potentially hazardous imports. Tuvalu is not yet a party to this convention, but ratification should be considered to assist Tuvalu in managing its hazardous imports.

2.3.4 Assessment with Respect to Annex B Chemicals (DDT)

DDT was used in Tuvalu historically for public health purposes, such as vector control for dengue fever. However this is no longer the case and DDT has been replaced by other pesticides such as malathion and temphos.

Activities under the Preliminary Pesticide Inventory included a visit to agricultural and health stores on Fongafale and Vaitupu. The other seven islands were visited as part of the inventory on unintentional POPs and there was no anecdotal evidence from residents that stockpiles of DDT exist.

Tuvalu has no known requirements for any future use of DDT, and therefore there is no need for an exemption under Annex B, Part II of the Convention. The only significant activities required are essentially the same as those already noted under section 2.3.1 above, for strengthening of the recording, monitoring and enforcement of the existing controls on pesticides generally.

2.3.5 Assessment of Unintentional Production of Annex C Chemicals (Dioxins, Furans, HCBs and PCBs)

A preliminary assessment was prepared as part of the NIP enabling activities for the assessment of releases of dioxins and furans in Tuvalu. The results from this initial assessment for Tuvalu were presented in a report by the Department of Environment – *Unintentional POPs Release Preliminary Inventory*, and are quoted in *Table 20* below.

Table 20: Summary of dioxins and furans release in Tuvalu[19]

[19] Viliamu Iese, July 2006, *Dioxins and Furans Inventory in Tuvalu*, Department of the Environment, Government of Tuvalu.

Sources categories	Annual Release (g TEQ/a)				
	Air	Water	Land	Product	Residue
Waste incineration	0.1546		NA	NA	0.0148
Ferrous and non-ferrous metal production	0.0000	0.0000	0.0000	0.0000	0.0000
Power generation and heating	0.4348	ND	NA	NA	ND
Production of mineral products	0.0000	0.0000	0.0000	0.0000	0.0000
Transportation	0.0000	0.0000	0.0000	0.0000	0.0000
Open burning	0.07602	ND	0.04	NA	0.0736
Production/use of chemicals and consumer goods	0.0000	0.0000	0.0000	0.0000	0.0000
Miscellaneous	0.0000014	NA	NA	NA	NA
Disposal / land filling	NA	0.000105	NA	NA	0.0242
Composting	NA	ND	NA	0.0157	NA
Total	**0.665**	**0.000105**	**0.04**	**0.0157**	**0.1126**
Grand Total			**0.8334**		
Formula: Source strength = Emission Factor X Activity Rate; Emission Factor = release of PCDD/PCDF (µg TEQ) per unit of feed material (tons or liters); Activity Rate = amount of feed material processed or product produced (tons or liters per year)					

The major releases of dioxins and furans to air in Tuvalu are believed to be from waste incineration, power generation and the burning of wood, coconut husks and coconut shells for cooking. Landfills may also be a significant reservoir source (as shown under "products" above). However, given the limitations of the toolkit, these conclusions may need to be confirmed through additional source-specific studies.

The survey included investigations of solid waste management practices on the islands of Fongafale, Niutao, Nanumea, Nanumaga, Nukufetau, Vaitupu, Nui and Nukulaelae. Niulaita was not visited.

The survey indicated that waste if often open burned on beaches on Niatao, Nanumaga, Vaitupu and Nui. Nukulaelae has a large burning site. Nukufetue reported two dumping sites, including one site between the island and the sea wall. Residents also said some goods are buried at the beach. Nanumea has one dumping site and also disposes of some goods by burial at the beach.

All of these burning activities are likely to be a source of dioxins and furans.

There are currently no specific regulatory controls on the release of dioxins and furans in Tuvalu, although the potential now exists for these to be introduced under the proposed Environment Act. This may also allows for the licensing of specific industrial sources, and the development of environmental standards.

Reducing the releases of dioxins and furans in Tuvalu will require a variety of different activities across the range of possible sources. Some of the key areas for action are:

- Solid waste management: The Department of Environment is already working on a national strategy in this area, which should see the development of programmes for waste minimisation, recycling and improved disposal methods. This should lead to a significant reduction in the amount of waste being disposed by incineration and open burning and therefore reduce dioxin and furans releases. Reduction of dioxin and furans should be incorporated into this plan;
- Waste incineration: The Ministry of Health has developed an action plan for upgrading the management of healthcare wastes, including the possible use of non-incineration technologies for waste disposal. Other sources such as quarantine waste incinerators should also be reviewed with a view to adoption of best available techniques and best environmental practices (BAT/BEP);
- Biomass sources, including shrub clearing should be assessed for the potential for emission reductions. Any programmes would most likely involve a significant public education component;
- Motor vehicle emissions: A national action plan is yet to be developed for activities in this area, which should eventually lead, indirectly, to reduced emissions of dioxins and furans, and other hazardous air pollutants; and
- Discharges from landfills and septic tanks (sewage) should also be assessed for their contribution to dioxin/furan releases.

2.3.6 Assessment with Respect to Stockpiles, Wastes and Contaminated Sites (Article 6)

Stockpiles and Wastes

During the investigation of pesticides and PCBs several small stockpiles of obsolete and unwanted chemicals in Tuvalu, were identified. These are summarised in *Table 21* below[20]. Most of the stockpiles of chemicals in Tuvalu are being stored under relatively unsafe conditions, awaiting action on disposal. According to the preliminary inventory, the stockpiles of these obsolete chemicals do not include scheduled POPs, but some of the pesticides are organic and persistent. The stockpiles of wastes shown in *Table 21* are those on Funafuti currently stored at the hazardous waste store in the Hanger.

Table 21: Stockpiles of Obsolete and Unwanted Chemicals at the Hanger

Location at the Hanger	Source	Chemical Name	Quantity	Status	Expiry Date
Hazardous Storage Area	Public	Car Batteries	64	Solid with acids (liquid)	Unknown
	Public	Motor bike batteries	17	Solid with acids (liquid)	Unknown
	Hospital (PMH)	Hydrochloric Acid (UN No. 1789 Class 8)	4 X 5Liters	Liquid	Unknown
	Unknown	Waste oil	1L	liquid	Unknown
General Area	Unknown	Waste oil	7 X 200Ldrums (3 drums ¾ full, 4 drums ½ full	liquid	Unknown
Small Room (Left Corner)	Hospital	Quellada lotion (for scabbies, 50mg/ml Permethrin)	1 bottle (100ml)	Cream	2000
		Athritic Cream	unknown	Cream	Unknown
		Ethambutol	400mg	tablets	2/1/2002
		Horseradish, Garlix + C	100 tablets	tablets	8/2000
		Abrocillin	unknown	tablets	Unknown
		Echninacea forte 3000	3 bottles	tablets	Unknown
		Dilantin (Phenytoin Capsules)	200 Capsules	Tablets/capsules	1999
		Erythrocin	2X250mg	tablets	10/2002
		Vitamin B	1 Bottle	tablets	05/2000
		Benzoin and Methnol Inhalation APF	50mL	liquid	Unknown
		Ibuprofen Tablets	200mg (50tablets)	tablets	1/2003
		Vitamin C tablets	500mg (100 tablets)	tablets	8/2000
		Atenolol Tablets	30 tablets	tablets	06/200
		Diltiazem Hydrochloride tablets	30mg (500tablets)	tablets	01/2001
		Paracetamol	unknown	Liquid	Unknown
		Gesterner	unknown	Cream	Unknown
		Purified Talc	unknown	Powder	Unknown
		Talcum B.P (French Chalk)	500g	Powder	6/87
		Reagent 3 (Blue Color)	35X5L Containers, 24 Containers ¾ full	Liquid	Unknown
		Reagent 3 (Blue Color)	15X0.5L	Liquid	Unknown
		Reagent 2 (Yellow Color)	11X0.5L	Liquid	Unknown
		Fire Extinguishers	4 cylinders (3 full:1 empty)	Powder	Unknown
		Benzapen 2,4 MEGA	10 vials in 1 box, 6 boxes	powder	Unknown
		Oral contraceptives Neogynon ED Fe	10 boxes in 1 set, there are more than 100	tablets	Unknown

[20] Viliamu Iese, July 2006, *Dioxins and Furans Inventory in Tuvalu*, Department of the Environment, Government of Tuvalu.

			sets (10 cardboard boxes full)		

At the Vaitupu agricultural store (Elisefou), a stockpile of obsolete and unwanted chemicals was also identified. The chemicals included:
- Diazinon 20P
- Malathion
- Stresnil (neuroleptic injection for pigs)
- Terramycin (antibiotic for animal treatment)
- Ficam (insecticide)
- Oxytocin
- Tricin
- Iodine tincture
- Celcure Tricunolec (wood preservation, Organo in copper naphthenate

On the island of Niutao a stockpile of twenty bags of ammonium nitrate, left over from the construction of the boat canal was identified. These represent an explosive risk.

As indicated by the information above, there is a need for significant improvements in the area of chemical inventory management and chemical storage on Funafuti and Vaitupu. Whilst the store in the Funafuti aircraft hanger is secure, the Elisefou store on Vaitupu contains poorly packaged chemicals that may be contaminating the receiving environment. Although none of the chemicals identified are scheduled POPs, many of the chemicals are both organic and persistent. Disposal of obsolete and disused chemicals is a high priority for Tuvalu.

The export of stockpiled chemicals as wastes is controlled under the Waigani Convention (the regional equivalent of the Basel Convention). The approval procedures associated with this are administered by the DE. DE is also responsible for monitoring and enforcing the requirements for management of hazardous wastes, although the country is currently lacking any dedicated facilities for the treatment and disposal of these wastes.

As any chemical disposal project is likely to take some years to be arranged and implemented, short-term initiatives to ensure the chemicals don't migrate into the environment, are also necessary. There is a need to safely repackage the chemicals on Vaitupu and move them to the hazardous waste store on Funafuti.

Contaminated Sites

Contaminated sites are believed to be a significant issue in Tuvalu, although the extent of the problem is yet to fully determined. The preliminary investigations under the NIP enabling project indicated numerous potentially contaminated sites, which require full characterisation to assess the contamination risk. These sites are detailed below.

Potentially contaminated sites – Funafuti

During the investigation of transformers at the Tuvalu Electrical Cooperation leaking oil was noted. As one transformer (collected under the POPs in PICs Project) contained PCB contaminated oil, the soil and groundwater at the site is potentially contaminated with PCBs. This was also noted by the AusAID Waste Management Project in 2002. As PCBs are heavy and bind to soil, the PCBs may be restricted to the soil, however both soil and groundwater at the site should be tested.

Potentially contaminated sites – Vaitupu

Two potentially contaminated sites were identified on Vaitupu. The Elisefou Agricultural store, discussed in Section 2.3.2, contains obsolete and poorly packaged chemicals that are leaking onto the floor of the shed. Anecdotal evidence suggests the chemicals have been stored for 20 years and rains have likely caused the chemicals to leak into the surrounding soils. Soil and groundwater testing is necessary to assess the impact of these chemicals and the contamination status of the site.

Deleted: ¶

Buried heavy equipment was also identified on Vaitupu. According to residents there a Japanese company building the Vaitupu wharf in 1998 buried all heavy equipment in three areas on the island, including under the football field. It is unknown if oil was drained from the equipment prior to burial. Soil

and groundwater sampling is necessary to assess the contamination status of the site.

Potentially contaminated sites - Nanumea
On the island of Nanumea 700, 44 gallon drums of World War II waste were identified. The drums contain hydrocarbons, either oil or kerosene and are leaking into the sea. Anecdotal evidence from residents indicates that the fish in this area are poisonous. Further investigation is necessary to ascertain the contents of the drums. The drums should also be removed from the sea and stored on a bunded area, so that further infiltration of hydrocarbons into the soil, sea and groundwater is prevented, and removed from the island.

At a general level, there is a limited amount of monitoring data to indicate the presence of chemical contaminants from rubbish dumps[21]. Beyond that, there is currently insufficient information and knowledge to determine the extent and magnitude of environmental contamination around the country, as a result of agricultural, industrial and domestic uses of chemicals and the disposal of associated wastes. This problem is further compounded by DE's lack of the necessary authority under a legislation to initiate work on identification and management of contaminated sites. In addition, the department also currently lacks the necessary expertise and resources (technical personnel and equipment) to undertake these activities.

The identified potentially contaminated sites require characterisation, but POPs staff first require training and capacity building in assessing potentially contaminated sites. Training should include instruction on collecting soil and groundwater samples. Training should also include instruction on the field based Risk Screening System (RSS). The RSS can be used to make an initial risk assessment of a potentially contaminated site, using data from a site visit. It does not require sampling, but does require the assessor to consider the receiving bodies and potential sources. The RSS allows the assessor to crudely rank sites as high, medium or low risk and thereby prioritise further work.

[21] UNEP Chemicals, 2002. *Regionally Based Assessment of Persistent Toxic Substances*, Pacific Islands Regional Report. Geneva.

2.3.7 Current Levels of Public Information, Awareness and Education

Information relating to the potential hazards of pesticides and industrial chemicals is, unfortunately, not routinely collected as part of the requirements under the Pesticides Act. Key GOT agencies do not have reasonable access to relevant international electronic databases and publications, although the Public Health Department (PHD) is often provided by international organisations with material safety data sheets (MSDS) for these chemicals including pesticides and pharmaceutical products, which they receive, mostly as donations. There is no formal system in place for the exchange of chemical information and data between Ministries or other agencies. In some cases officers do not know the existence of these databases within their own ministries or available in other ministries.

The Environment, Health and Labour departments do not have established roles in education and awareness activities relevant to their particular mandates, and this includes activities directed at POPs chemicals. The Department of Education began fortnightly programs about educating primary age pupils but it does not include programmes related to the environment and certainly not POPs. The DE has just been active in raising awareness in the chemicals area over the last 2 years with the Waste Management Project initiated by AusAID. This project provided a path for support of the POPs Enabling Activity project. In 1998, the AusAID/SPREP POPs in PICs project collected data on POPs, which incidentally began the process of the awareness of the government officers about POPs. The general public, however, only came to be aware of POPs when the POPs Project started its enabling activities in July 2005.

As of January 2007, POPs is not a part of the educational curriculum in Tuvalu although this group's level of awareness about the effect of POPS is growing. The other facet of the POPs question is the identification, handling and storage, a facet of chemical management that is required to be widely disseminated to the public as soon as possible.

A recent survey of chemical awareness in Tuvalu has shown that there are significant concerns about practices for chemical storage, handling and use,

both at work and in homes. And these occur despite the fact that people appear to understand that chemicals are potentially hazardous. This would suggest that greater emphasis in future programmes should be given to the promotion of safe practices, rather than the potential hazards only.

2.3.8 Relevant Activities of Non-Governmental Stakeholders

There are several public interest groups in Tuvalu with activities relevant to POPs and/or chemical management generally. The most significant of these are as noted below.

The Tuvalu National Association of Non-Government Organisations (TANGO), through its member "Island Care", has been active for many years in raising the issues of obsolete stockpiles and hazardous wastes in Tuvalu, and was also involved in awareness raising activities in the lead-up to the adoption of the Stockholm Convention. Recent work in this area has been directed at encouraging Tuvalu to become a Party to the Convention, and investigating options for national legislation relevant to Stockholm and other international chemical conventions. The specific issues of POPs chemicals however have only recently become a topic with the organisation with the establishment of the POPs Project, of which Island Care is a member of the NCC, representing TANGO.

2.3.9 Systems for the Assessment and Regulation of New or Existing Chemicals

The only systems in Tuvalu for the assessment and regulation of new or existing chemicals are those available under the Pesticides Act and the Poisons and Drug Act. Under the Pesticides Act, no pesticide may be offered for sale or use within Tuvalu unless it is first registered with the Registrar of Pesticides. The requirements for the types of data to be submitted in support of registration, and labelling specifications are covered in the accompanying Regulations. The registration of specific pesticides can be cancelled by the Registrar under section 7 of the Act.

2.3.10 An Alternative Assessment Processes

An alternative process for assessment of new chemicals was proposed in the *Tuvalu National Chemical Profile*. The proposed alternative assessment procedure suggested in the National Profile of Chemical Management in Tuvalu, Chapter 2, is;

"To safeguard against accidental hazards, the responsibility for managing these types of chemicals is vested upon authorized Government Ministries/Departments, namely the Environment Department and the Ministry of Health. However, there is a need for this responsibility to be better coordinated across the public and private sector. A possible way forward would be in the setting up of an Occupational Health and Safety (OH&S) Committee that would have the task of putting in place national OH&S guidelines and protocols that would govern the operations of workers in Tuvalu, including workers in the non-formal sector such as local farmers and fishermen".

The Occupational Health and Safety (OH&S) Committee addresses not only chemicals that can be imported for their safety record in relation to workers but also how the environment in which workers are to work in is managed in such a way as to prevent injuries to employees and employers alike not only from chemicals but other unsafe practices.

Current Tuvalu legislations addressing employment do not address the safety of workers in workplaces nor compensation in the event of injuries. It is important therefore that the safety of workers and compensation for injuries or incapacity to work due to work related injuries or death finds a legislation under which they can be addressed. Among these guidelines are requirements for minimum conditions of safety from physical and psychological aspects of an employment involving chemicals.

3. Suggested Strategies and Proposed Work Plan

3.1 Policy Statement

GOT is committed to ensuring a safe environment for its people and future generations and has committed itself to protecting its unique environment and its biological diversity. Environmental sustainability is one of the Guiding Principles for economic and social development in Tuvalu, and GOT has demonstrated its commitment to this principle through actions such as the initiatives taken such as the development, by the Department of Environment tasking the OAG, of an Environment Protection Bill and other initiatives related to POPs and chemicals management generally. Acceding to the Stockholm Convention on Persistent Organic Pollutants (POPs) is one of many avenues by which GOT believes Tuvalu can benefit in improved quality of life and protection of human health and the environment.

Figure 1 outlines the process of preparing the NIP. The POPs Coordinating Unit (PCU) made awareness visits to all islands of Tuvalu. The islands, through the *Kaupule*, all responded with their needs in relation to POPs.

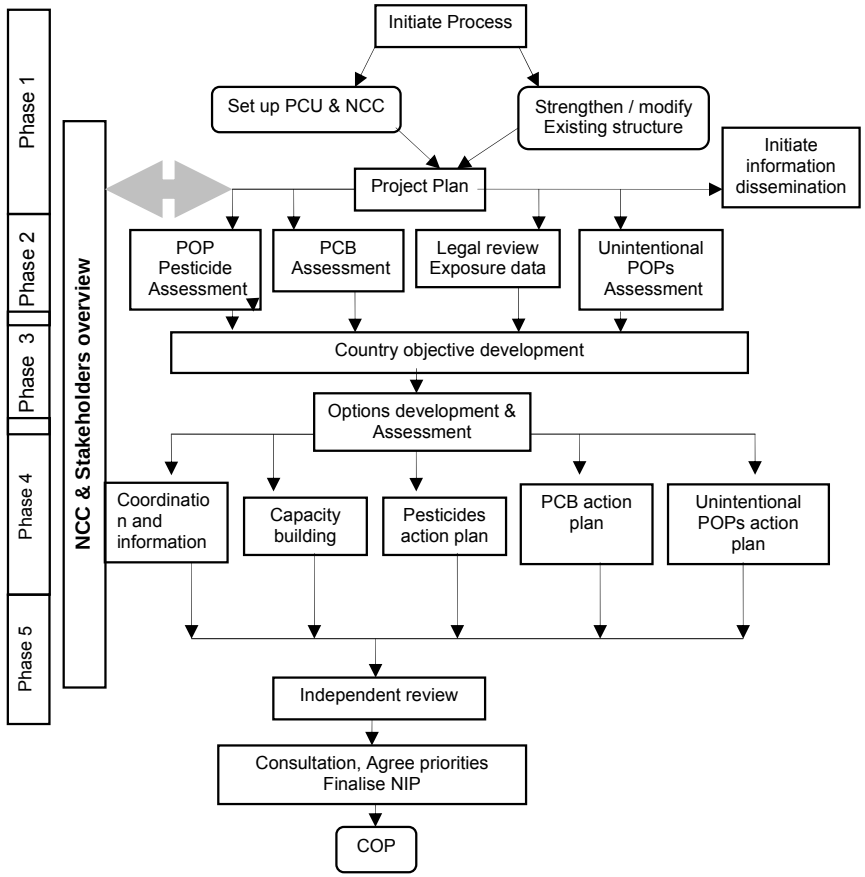


Figure 1: Steps in Preparing the NIP

3.2 Implementation Strategy: Work Plans and Activities

This NIP for the Stockholm Convention on Persistent Organic Pollutants is based around five (5) strategies and work plans. The goals and objectives of each strategy not only reflects the requirements of the Stockholm Convention, but are also intended to address the specific issues identified as being most relevant for Tuvalu. The proposed strategic action plans presented below (3.2.1 to 3.2.5) were developed based on the NIPs work and identified information gaps. The five proposed strategies are as follows:

1. Strategy for National Coordination, management, reporting (Article 15), information exchange (Article 9) and public information, awareness and education (Article 10);
2. Strategy for Capacity Building;
3. Strategy for the Reduction and Elimination of Intentional Releases of POPs Pesticides (Annex A, Part I, POPs and other pesticides (Article 3);
4. Strategy for the Reduction and Elimination of Intentional Releases of POPs (PCBs) (Annex A, Part II, PCBs (Article 3))
5. Strategy for the Reduction and Elimination of Unintentional Releases of POPs (Dioxins and Furans, Article 5)
6. Strategy for elimination of releases from stockpiles and wastes
7. Strategy for Research, Development and Monitoring

Further details of each of these strategies are presented in the following sub-sections. Comprehensive lists of activities, timeframes and resource needs, are provided in Annex 3. A stakeholder analysis and logframe are provided in Annexes 4 and 5 respectively.

3.2.1 Strategy for National Coordination, management, reporting, information exchange and public information and awareness and education

The following section sets out the Stockholm Convention requirements for national coordination and management, reporting (Article 15), information exchange (Article 9) and public information, awareness and education (Article 10). It then explains the activities undertaken by the GOT during the NIP development phase to meet these requirements and sets out a strategy to continue to meet these requirements post-NIP.

The requirements under Article 15 of the Stockholm Convention include the following:

1. Report to the COP on the measures taken to implement the provisions of this Convention and on the effectiveness of such measures;
2. Provide to the Secretariat:

(a) Statistical data on its total quantities of production, import and export of each of the chemicals listed in Annex A and Annex B or a reasonable estimate of such data; and

(b) To the extent practicable, a list of the States from which it has imported each such substance and the States to which it has exported each such substance.

The requirements under Articles 9 and 10 of the Stockholm Convention include the following:

1. Facilitate or undertake the exchange of information regarding;

a) the reduction or elimination of the production, use and release of POPs and
b) alternatives to POPs, including information relating to their risks as well as their economic and social costs.

This information should be exchanged directly or through the Secretariat of the Convention;

2. Designate a national focal point for the exchange of such information;

3. Promote and facilitate public information, awareness and education, as detailed in Article 10. This includes awareness among policy and decision makers, the provision of information to the public, and the development of educational and public awareness programmes on POPs, especially for women, children and the least educated; and
4. Arrangements for training of workers, scientists, educators, and technical and managerial personnel.

Since the inception of NIP development, the overall national focal point and coordinating entity for the POPs Project has been the Secretary for the Ministry of Natural Resources and Lands. At the operational level, the project is coordinated by the Project Coordinating Unit (PCU) consisting of the Coordinator and the Assistant Coordinator. The unit also consisted of a National Technical Expert who was a member of the PCU for the initial ten months, contracted to prepare preliminary inventories of chemicals, including POPs, and stockpiles of wastes and contaminated sites. The DE has been responsible for management of the development of the NIP, regular reporting to the Secretariat and information exchange.

Regarding Article 15, during the NIP development phase there has been no production of, or import to, Tuvalu, of Annex A or B chemicals. One PCB contaminated transformer casing and two drums of PCB contaminated transformer oil was exported to Australia for destruction at BCD Technologies in Brisbane, Australia. This was completed under the POPs in PICs Project, funded by the Government of Australia. The Stockholm Convention Secretariat was informed of this export in a progressive report.

Regarding Article 9, information exchange, Tuvalu has designated Director of Environment as the national focal point.

Regarding Article 10, public information, awareness and education, since the inception of the enabling activity in mid-2005 the DE has been active in raising awareness and providing public information in the chemicals area in support of POPs in its enabling activities. These activities include consultation during inventory development, with industry, government departments, NGOs and residents on the existence of POPs.

Despite the above activities, a recent survey of chemical awareness in Tuvalu indicated that there are significant concerns about practices for chemical storage, handling and use, both at work and in homes. There is also clear evidence of the need for improving the current knowledge and understanding of personnel in key agencies such as Health, Education, Labour, Marine, ICT, TCS regarding POPs and harmful chemicals in general. It has also become evident that there should be greater and more frequent exchange of information regarding chemicals, including POPs, between all stakeholders and the public.

To ensure the effective implementation of the NIP, the following strategy has been developed for national coordination, management, reporting, information exchange and public information and awareness and education.

The **goals** of the strategy are to:
- effectively coordinate, manage, report and exchange information on Stockholm Convention implementation, and to generate enhanced chemical awareness through ongoing provision of public information on the Stockholm Convention.

The **objectives** of the strategy are to**:**
- employ a permanent national coordinator for implementing the NIP and other related chemicals initiatives;
- maintain a high level of national awareness and understanding of POPs and related hazardous chemicals, including an understanding of the potential health, environmental and economic impacts, and of the specific agency roles in implementing the NIP.
- sustained, effective gathering and sharing of information and reporting on, NIP implementation, nationally and internationally.

Implementation Strategy

Lead Agencies: The lead agency for this Action Plan will be the Department of Environment, but it will be important to also work closely with all other key stakeholders.

Programme Implementation: The key steps involved in implementation are summarized with a detailed list of activities in Annex 3.

Crucial to the implementation of other strategies included in the NIP is the central coordination by a responsible entity. Without this coordinating mechanism, efforts may be duplicated leading to inefficiency and unnecessary expenses, or they may fail to happen at all. Without an ongoing coordinating mechanism there will be no office, or individual that is responsible for implementing the strategies included in this plan. It is noteworthy that during the NIP development, the NIP Project Officer was also responsible for work on other chemical related initiatives, including SAICM and in representing Tuvalu at the Open-ended Working Group on Mercury. The appointment of a National Coordinator, and ensuring that funds are secured for the office and related expenses in carrying out its task in coordinating the implementation of the NIP, are key priorities, that will have spill-over benefits to other chemicals processes.

To maintain a high level of national awareness Tuvalu will:
- establish and maintain a POPs library and database of literature materials related to chemical management, chemicals, including POPs;
- continue to provide information support to main chemical users including secondary and tertiary schools and encourage including units of chemical management especially related to POPs in curricula;
- convene interagency and multi-stakeholder workshops to identify roles and how NIP implementation activities can fit into existing and future sectoral strategic plans.

To ensure sustained information gathering, exchange and reporting Tuvalu will nominate an information exchange officer to:
- gather, disseminate and store information on POPs and interpret it for the Convention;
- develop a recommendation to become a Party to the Rotterdam Convention on Prior Informed Consent;
- continue the active involvement of Tuvalu as a Party to the Convention and to coordinate across government, to gather, disseminate and store information on POPs.
- report on activities as determined by COP

Resource Needs and Training

The overall resource needs and timing are summarised below and more detailed information is given in Annex 3.

Table 22: Strategy for National Coordination management, reporting, information exchange and public information and awareness and education.

Objective	Internal Costs (US$)	External Costs (US$)	Total Costs (US$)	Duration (months)
1		65,000	65,000	20 (ongoing)
2	10,000	11,000	21,000	20 (ongoing)
3	3,500	7,000	10,500	20 (ongoing)
Total	13,500	83,000	96,500	

3.2.2 Strategy for increased capacity

The proposed strategy for capacity building is based on implementing the requirements of the Stockholm Convention in the Tuvaluan context. Capacity to manage POPs and other hazardous wastes has increased in Tuvalu, since the inception of the NIP project, but building capacity must be an ongoing process. All individual strategies include elements of capacity building, including training directly related to the tasks in the strategy.

This specific strategy for capacity building focuses on developing the capacity of Department of Environment and Customs staff on import restrictions and detection of illegal imports of pesticides and PCBs.

The existing controls on the importation and use of pesticides in Tuvalu are quite adequate for their intended purpose. However, these currently suffer from a lack of resources for effective implementation and enforcement. In addition, the operational personnel within the key agencies of Customs and Agriculture lack the necessary training to allow them to effectively fulfil their roles in this area.

Much of the work is intended to be carried out by local personnel with assistance from international experts as, and when, required. This approach is intended to assist in developing local capacity for POPs management and implementation of the Convention.

The **goal** of the strategy is to build capacity of staff in control of imports and regulation and management of pesticides.

The **objective** of the strategy is:

1. Train staff on effective control of import, enforcement of import restrictions, detection of illegal imports and on managing information on pesticide imports.

The training will involve DE staff, customs officials, Department of Agriculture staff and NCC members.

Table 23: Strategy for Capacity Building

Objectives	Internal Costs (US$)	External Costs (US$)	Total Costs (US$)	Duration
1	2,000	22,000	24,000	3 months

3.2.3 Strategy for the Reduction and Elimination of Intentional Releases of POPs pesticides

(Annex A, Part I, POPs and other pesticides (Article 3)

Article 3 of the Stockholm Convention requires parties to prohibit and/or take measures to eliminate production and use, and import and export of Annex A chemicals.

In Tuvalu, there is no evidence of any current trade or use of POPs pesticides at present. None of the POPs chemicals are currently prohibited from use. The use of pesticides has been stopped in 1996 by the DA due to the recommendation by the SPC to use biological instead of chemical control. This recommendation however currently only applies to the islands of Vaitupu and Nanumaga where infestation with the "coconut scale" is occurring.

Surveys of pesticide users undertaken during the enabling activities indicate the need for better monitoring and enforcement of the current controls over all pesticides. This would include capacity building for the DC, for better enforcement of import restrictions and detection of illegal imports. Capacity building activities addressing the control on imports are outlined in the section on capacity building.

The enabling activities also identified a site on Vaitupu housing disused and poorly packaged chemicals that may be leaching into the environment. Whilst the chemicals identified were not scheduled POPs, many were hazardous organic pesticides that persist in the environment. For the purposes of this project these chemicals are treated like POPs. This is considered a pragmatic approach, as the risk these chemicals pose to human health and the environment is real. Further, the Stockholm Convention is evolving and new chemicals are being considered, for addition to the Convention.

Goal

- Ensure intentionally produced POPs and other pesticides are not released into the environment.

Objectives

1. Train DE staff in OH&S associated with hazardous waste handling;
2. Repackage chemicals on Vaitupu in the Elisefou agriculture store and temporarily store them safely; and
3. Ship chemicals to Funafuti for safe store in the hazardous waste store.

Implementation Strategy

Lead Agencies: The lead agencies for this suggested action plan are the Department of Environment.

Programme Implementation: the key steps involved in implementation are summarised below, while a more detailed list of activities is given in Annex 3.

Safely repackaging hazardous chemicals, requires training in the OH&S of handling such chemicals. As such training would be undertaken for DE staff in appropriate handling of chemicals and use of personal protective equipment. Staff will be trained in identification and safe handling of chemicals and the training would include a combination of office-based and field-based (on the job training).

Repackaging will be undertaken on Vaitupu, at the Elisefou chemical store, by a hazardous waste expert, with the assistance of DE staff. The hazardous waste expert will be expected to train DE staff in safe handling and repackaging of chemicals.

Chemicals will then be shipped to Funafuti for storage in the hazardous waste store. The hazardous waste expert will advise on appropriate disposal methods. It is expected some of the chemicals may be able to be sent back to the manufacturers, or be used on Funafuti. If disposal is the only option, he DE will seek assistance on the disposal of these obsolete chemicals through AusAID, NZAid and other donors. It is understood the Agence Francaise de Développement (AFD) is undertaking a study to assess the feasibility of several solid and hazardous waste management initiatives in the Pacific Region. The DE will make contact with AFD to ensure they are aware of the existence of the small volumes of obsolete pesticides in Tuvalu.

Resource Needs Timing and Duration:

The overall resource needs and timing are summarised below, while more detailed information is given in Annex 3.

Table 24: Strategy for the Reduction and Elimination of Intentional Releases of POPs (Annex A, Part I, POPs and other pesticides- Article 3)

Objective	Internal Costs (US$)	External Costs (US$)	Total Costs (US$)	Duration
1	5,000	15,000	20,000	2 months
2	1,300	31,000	32,300	2 months
3	2,000	10,000	12,000	1 months
TOTALS	8,300	56,000	64,300	

3.2.4 Strategy for the Reduction and Elimination of Intentional Releases of POPs PCBs

(Annex A, Part II, PCBs -Article 3)

Under Article 3 and Annex A, Part II, of the Convention, Parties to the Stockholm Convention are required to take the following actions:

- Prohibit and/or take legal and administrative action necessary to eliminate production and use of Annex A, Part II, chemicals (PCBs);
- PCBs in existing equipment, such as transformers and capacitors, are to be eliminated by 2010 and until then is permitted only in a manner that prevents or minimises human exposure and release into the environment;
- Prohibit the import and export of PCBs, except for the purpose of environmentally sound waste management ; and
- Work towards the environmentally sound management of PCB wastes as soon as possible but no later than 2010.

As with most other countries, PCBs were used in the past in Tuvalu, especially in transformer oils. The POPs in PICs Project organized by the SPREP and implemented by GHD Pty Ltd, on behalf of AusAID, identified one PCB-contaminated transformer at the TEC. This transformer was transported to Australia for destruction under the Waigani Convention in 2006.

However, according to the survey carried out by the POPs Project, not all transformers have been tested. According to the survey, in-use transformers at TEC substations on Funafuti and the outer islands were not tested. The in-use transformers on Funafuti are suspected to be PCB contaminated and testing these, and the associated switch-gears is a high priority. Initial testing will be undertaken with field test kits. Positive samples should be extracted from equipment testing positively and sent to a laboratory in New Zealand or Australia for PCB analysis. If these transformers test positive for PCBs arrangements will need to be made for their flushing and the export and disposal of the PCB contaminated oil.

The transformers on Vaitupu were reportedly manufactured post-1980 and are therefore unlikely to contain PCB contaminated oil.
While Tuvalu can use the mechanisms of the Waigani Convention to transport PCB contaminated items and other POPs, no specific regulatory actions have been taken in Tuvalu for the removal and disposal of old electrical equipment containing PCBs, such as the capacitors used in fluorescent lighting ballasts.

Tuvalu needs to development a system for the identification, collection, storage and environmentally sound management and disposal of capacitors and other small items of electrical equipment potentially contaminated with PCBs.

There is also a need for strengthening of DC to ensure that future imports of PCBs, if any, are identified and stopped at the point of entry into the country and this is addressed in Section 3.2.2.

Goal
Test online transformers and determine if they contain PCB contaminated oil. Develop a system to identify, collect, store and dispose of capacitors and other small items containing PCBs.

Objectives

1. Training on the use of field test kits, test in-use transformers and switch gears and quantify the amount of PCB contaminated oil (if any) remaining in Tuvalu;
2. Sample soil in the immediate vicinity of PCB-contaminated oil, and test the samples for PCBs.
3. Establish and implement a system of safe handling, storage and transport of PCB contaminated equipment, such as capacitors;
4. Export, eliminate and destroy all PCBs, PCB-containing materials and PCB waste no later than 2010.

The goal and objectives for this action plan can be achieved within the existing regulatory and management systems. The primary requirements are training in the use of field test kits, procurement of test kits and laboratory analysis.

A system to documenting the management of PCB contaminated equipment will also be developed. Given that fluorescent light bulbs are often found in houses, effective collection would need to be supported by education and awareness programmes to ensure optimum absorption by target groups.

Once an accurate understanding of the amount of PCB contaminated oil and equipment is developed, the DE will analyse options for PCB waste collection and disposal.

The need to strengthen the existing import control systems to ensure future compliance with the Convention's requirements is addressed in Section 2.3.2.

Implementation Strategy
Lead Agencies: The lead agency for this will be the Department of Environment, working in close cooperation with the Department of Energy, Department of Transport, the Public Works Department and the Tuvalu Electricity Corporation.

Programme Implementation: the key steps involved in implementation are summarised below, while a more detailed list of activities is given in Annex 3.

Resource Needs and Timing:
The overall resource needs and timing are summarised below, while more detailed information is given in Annex 3.

Table 25: Strategy for the Reduction and Elimination of Intentional Releases of POPs (Annex A, Part II, PCBs -Article 3)

Objective	Internal Costs (US$)	External Costs (US$)	Total Costs (US$)	Duration
1	5,000	18,500	23,500	2 months
2		4,000	4,000	2 months
3	4,000	10,000	14,000	13 months
4	1,000	102,500	103,500	6 months
TOTALS	10,000	135,000	165,000	

3.2.5 Strategy for the Reduction and Elimination of Unintentional Releases of POPs

(Dioxins and Furans, Article 5)

Under Article 5, and Annex C, Parts I, II, and III of the Convention, Parties are required to take measures for continuous minimisation of releases of unintentionally produced POPs (PCBs, HCBs, Dioxins and Furans) and where possible, eliminate their releases. The primary source categories are detailed in Annex C of the Convention, and the key requirements for action are as follows:

1. Establish and finalise an action plan within 2 years after entry into force;
2. Promote the application of BAT and BEP for all other sources; and
3. Report on the success of proposed strategies every five years.

An initial estimate of dioxin and furan releases for Tuvalu was prepared using the Standardised Toolkit, which was developed by UNEP Chemicals. (*Table 20*). The major releases of dioxins and furans to air are believed to be from waste incineration, power generation and the burning of wood for cooking. Domestic rubbish burning and scrub clearing may also be significant contributors, while landfills may be a significant reservoir source. However, given the limitations of the toolkit, these conclusions may need to be confirmed through additional studies.

There are currently no specific regulatory controls on the release of dioxins and furans in Tuvalu, although the potential now exists for these controls to be introduced under the new Environment Protection Act, as this also allows for the development of environmental standards.

Furthermore Tuvalu is developing a National Solid Waste Management Strategy. As domestic waste burning is both common on all Tuvaluan islands and is a source of dioxin and furan release, inclusion of methods to reduce dioxins and furans should be included in the Solid Waste Management Strategy.

Goal

- Progressive reductions in the releases of dioxins and furans and other unintentional POPs in Tuvalu based on best environmental practices and linking dioxin and furan releases into the National Solid Waste management Strategy and reducing burning of municipal waste.

Objectives

1. Include methods to reduce uPOPs in related national policies including the National Solid Waste Management Strategy, Vehicle Emissions Action Plan and the programme on medical wastes.

Several initiatives are already under way in Tuvalu which will be reflected in the development of this action plan; namely the National Solid Waste Management Strategy, the Vehicle Emissions Action Plan, and a programme for upgrading the management and disposal of medical wastes.

One of the primary requirements for reductions of unintentional POPs under the Convention is the application of BAT/BEP, specifically related to open burning. Open burning is common to all islands of Tuvalu, but is is an environmentally unacceptable process that generates chemicals listed in Annex C of the Stockholm Convention and numerous other pollutant products

of incomplete combustion. To successfully address this challenging issue, the DE must work closely with the Waste Management Officer to ensure the national Solid Waste Management Strategy includes BAT/BEP for open burning and educate stakeholders.

The short term aim is to reduce the amount of material disposed of through open burning. Also the strategy will include the need to avoid: including non-combustible materials, such as glass and bulk metals, wet waste and materials of low combustibility; waste loads containing high chlorine content, or chlorinated organics such as PVC; and materials containing catalytic metals such as copper, iron, chromium and aluminum, even in small amounts.

According to the BAT/BEP guidelines, materials to be burned should be dry, homogeneous or well blended, and of low density, such as non-compacted waste. With respect to the burning process, aims should include: supply sufficient air; maintain steady burning or rate of mass loss; minimize smouldering, possibly with direct extinguishment; and limit burning to small, actively turned, well-ventilated fires, rather than large poorly ventilated dumps or containers.

Implementation Strategy
Lead Agencies: The lead agency for this Action Plan will be the Department of Environment, although the work will require significant inputs from other agencies, including Health, Agriculture, and Transport.

Programme Implementation: The key steps involved in implementation are summarised below, while a detailed list of activities is provided in Annex 3.

Resource Needs and Timing:
The overall resource needs and timing are summarised below, while more detailed information is given in Annex 3.

Table 26: Strategy for the Reduction and Elimination of Unintentional Releases of POPs (Dioxins and Furans- Article 5)

Objective	Internal Costs (US$)	External Costs (US$)	Total Costs (US$)	Duration
1	4,000	26,000	30,000	20 months

3.2.6 Strategy for the Reduction and Elimination of Releases from Stockpiles and Wastes
(Article 6)

The primary requirements for stockpiles and wastes, as detailed in Article 6 of the Convention, are as follows:

1. Identification of stockpiles that consist of or contain intentionally produced POPs;
2. Management of such stockpiles in a safe, efficient and environmentally sound manner;
3. Identification of products and articles in use and wastes that consist of, contain or are contaminated, with intentionally or unintentionally produced POPs;
4. Measures to ensure safe handling, collection, transport and storage of POPs wastes, and environmentally sound disposal; and
5. Identification and management of sites contaminated by POPs.

As part of the enabling activity, the Department of Environment identified some stockpiles of obsolete and unwanted chemicals in Tuvalu. Although these stockpiles include pesticides that are both organic and persistent, no scheduled POPs were identified. Most of the stockpiles are being stored under relatively unsafe conditions, awaiting action on disposal. The Department of Environment is responsible for monitoring and enforcing the requirements for management of hazardous wastes in Tuvalu, although the country is lacks any dedicated facilities for the treatment and disposal of these wastes, there is a hazardous waste store in Funafuti. The strategy addressing safe handling of stockpiled chemicals is addressed in Section 3.2.3, reduction and elimination of intentional releases of POPs and other pesticides.

Several potentially contaminated sites exist in Tuvalu, but further investigation is necessary to determine their significance. Anecdotal evidence suggests there are a number of sites around the country where pesticides were disposed by burial. However, there are no accurate records available on the quantities and types of pesticides involved. These sites should be investigated and the appropriate remedial action taken.

The DE has no prerequisite authority under any legislation to initiate work on identification and management of contaminated sites. At present, the department is conducting its work on an *ad hoc* basis and its activities at present in identification of contaminated sites have not been legally challenged.

Goal

- Protect human health and the environment protected from contaminated sites by complete identification and characterisation of such sites by and development of appropriate management strategies and remedial actions.

Objectives

1. Train staff in the assessment of contaminated sites using the field-based Risk Screening System and environmental sampling; and
2. Undertake detailed assessments of potentially contaminated sites in Tuvalu by 2008, using the Risk Screening System, environmental sampling of medium and high risk sites, and remedial action for contaminated sites.

The existing regulatory and management systems in Tuvalu are generally quite adequate for addressing the goal and objectives for this action plan. The main requirements are to develop the knowledge and capacities within DE and other relevant agencies, and the operational measures required for implementing these programmes.

Implementation Strategy

Lead Agencies: The lead agency for this Action Plan will be the Department of Environment, but significant inputs will also be required from the Department of Agriculture.

Programme Implementation: The key steps involved in implementation are summarised below, while a more detailed list of activities is given in Annex 3.

Objective 1: Train staff in the assessment of contaminated sites using the field-based Risk Screening System and environmental sampling

1. Establish local capacity for the identification and management of contaminated sites, via classroom and field training by end of 2008;

Objective 2: To conduct detailed assessments of potentially contaminated sites in Tuvalu by 2007 and develop remedial action for such sites as necessary

1. Undertake further assessment of potential contaminated sites identified by SPREP POPs in PICs report by 2008, using the Risk Screening System to rank sites as high medium and low priority and field sampling;
2. Sign and fence off any contaminated sites by 2009;
3. Obtain necessary safety equipment;
4. Develop management plan for highly contaminated sites by end of 2008;
5. Develop cost estimates and obtain funds by mid-2009 to remediate or clean up contaminated sites;
6. Remediation of highly contaminated sites by end of 2010; and
7. Public awareness to help identify additional contaminated sites.

Resource Needs and Timing:

The overall resource needs and timing are summarised below, while more detailed information is given in Annex 3.

Table 27: Strategy for the Reduction and Elimination of Releases from Stockpiles and Wastes (Article 6)

Objective	Internal Costs (US$)	External Costs (US$)	Total Costs (US$)	Duration

1		25,000	25,000	4 months
2		62,000	62,000	30 months
TOTALS		87,000	87,000	

3.2.7 Strategy for Research, Development and Monitoring

(Article 11)

Under Article 11 of the Convention, Parties are required to encourage and /or undertake appropriate research, development, monitoring and cooperation, pertaining to POPs and, where relevant, to their alternatives and to candidate POPs.

The technical infrastructure for POPs monitoring and research in Tuvalu is non-existent. Tuvalu does not have a laboratory of the capacity to conduct POPs analysis.

Tuvalu has volunteered to be part a regional monitoring programme, coordinated and proposed by the University of the South Pacific, Fiji. The project plans to sample human breast milk and air from the region. It is hoped that this regional project will lead to increased capacity of Department of Environment staff.

Goal

- Contribute to determining the effectiveness of interventions undertaken under the Stockholm Convention, to help ensure most efficient use of resources.

Objectives

1. To train staff from Department of Environment in the collection of air and human breast milk samples, and in the interpretation of results; and
2. To assist the University of the South Pacific in the collection of air and water samples.

Implementation Strategy

Lead Agencies: The lead agency for this strategy will be the DE, although other key stakeholders such as DA and DH should also be involved in any training activities.

Programme Implementation: The key steps involved in implementation are detailed in Annex 3.

Resource Needs and Timing:
The overall resource needs and timing are summarised below, while more detailed information is given in Annex 3.

Table 29: Strategy for Research, Development and Monitoring (Article 11)

Objective	Internal Costs (US$)	External Costs (US$)	Total Costs (US$)	Duration
1	1,000		1,000	1 month

3.3 Timetable for Plan Implementation and Measures of Success

The timetable for implementation of these plans is included in the detailed matrix of activities given in Annex 3. Most of the activities are intended to be carried out over the next three years, although some involve on-going commitments which will continue for many years into the future.

The measures of success are indicated in the performance indicator columns within the matrices in Annex 3.

3.4 Resource Requirements

The total estimated cost for implementing all of the planned activities is unknown at the time of preparing this proposal and *Table 31* below is intended to be filled in as the estimates are gathered from the relevant affected agencies.

Table 31: Summary of Resource Requirements for Implementation of Action Plans

No.	Action Plan	Cost Estimates (US dollars)		
		Internal	External	Total
1	Strategy for National Coordination, management, reporting, information exchange and public information and awareness and education	13,500	83,000	96,500
2	Strategy for Capacity Building	2,000	22,000	24,000
3	Strategy for the Reduction and Elimination of Intentional Releases of POPs (Annex A, Part I, POPs and other pesticides- Article 3)	8,300	56,000	64,300
4	Strategy for the Reduction and Elimination of Intentional Releases of POPs (Annex A, Part II, PCBs- Article 3)	10,000	135,000	145,000
5	Strategy for the Reduction and Elimination of Unintentional Releases of POPs (Dioxins and Furans, Article 5)	4,000	26,000	30,000
6	Strategy for the Reduction and Elimination of Releases from Stockpiles and Wastes (Article 6)	0	87,000	87,000
7	Strategy for research and development	1,000	0	1,000
	TOTALS	38,800	409,000	447,800

Annex 1: Technical Information on Persistent Organic Pollutants

Aldrin

Aldrin has been manufactured commercially since 1950 and used throughout the world up to the early 1970s to control soil pests such as corn rootworm, wireworms, rice water weevil and grasshoppers. It has also been used for protection of wood against termites. Aldrin is readily metabolised to dieldrin by both plants and animals. Biodegradation is slow and it binds strongly to soil particles and is resistant to leaching into groundwater.

Dieldrin

Dieldrin was mainly used as a soil insecticide. It is no longer manufactured in Canada and the USA, and its use is now restricted for termite control. Manufacture in Europe, especially for export to developing countries, continued until the late 1980s. It is a degradation product of aldrin. Dieldrin is extremely persistent in soil (half-life greater than seven years) and has a long half-life in biota (Howard 1991). It is the most potent carcinogen of the major organochlorine pesticides.

Endrin

Endrin was first used in the 1950s against a wide range of agricultural pests, mostly on cotton but also rice, sugar cane, maize and other crops. It has also been used as a Rodenticide. It is highly persistent in soils (half-life of up to 12 years) and has a high bioconcentration factor in fish. It is very toxic to fish, aquatic invertebrates and phytoplankton.

Chlordane and Heptachlor

Technical grade chlordane is a mixture of at least 120 compounds. In the past, chlordane was released into the environment primarily from its application as an insecticide and for seed dressings and coatings. In the USA, it was used extensively before 1983, and from 1983 to 1988, it was registered for termite control. It was cancelled for this use in 1988. Heptachlor has a similar use profile and is of particular interest since its oxidation product, heptachlor epoxide, is carcinogenic, and has been found in the Arctic abiotic and biotic environments.

DDT (Dichlorodiphenyltrichloroethane)

DDT was introduced in 1945 as an insecticide and is still in use today in many parts of the world where malaria is endemic. The technical product consists of 4,4'-DDT (or p, p'-substituted) and its o,p'-DDT isomer, as well as their dechlorinated analogs (p,p'- and o,p'-DDD). DDT is highly persistent in soil, with a half life of up to 15 years. It also exhibits high bioconcentration factors. In the environment it is metabolised to DDD and DDE, both of which have similar properties to DDT.

Toxaphene

Toxaphene is produced by the chlorination of technical camphene or γ-pinene and can consist of over 300 congeners, mainly bornanes and camphenes substituted with 6-10 chlorines, with an average composition of $C_{10}H_{10}C_{l8}$. Analysis has been difficult because of the mixture's complexity, and because of lack of standards for individual components. Analytical standards for some chlorinated bornanes have recently become available. Nevertheless, the levels and effects of toxaphene are not well studied even though it is a significant contaminant in some regions.

Mirex

Mirex was used as an insecticide and fire retardant, mainly in the USA and Canada. Its presence in the Lake Ontario food web has been well documented. Mirex is extremely persistent in soils and sediment with an estimated 'field half-life' of five to ten years. Although mirex has a very high molecular weight, it has the physical properties of a relatively volatile compound capable of undergoing long-range transport. Its presence in the Arctic at low levels is consistent with its volatility and persistence.

Hexachlorobenzene

HCB is formed as a by-product in the production of a large number of chlorinated compounds, particularly lower chlorinated benzenes, and in the production of several pesticides. It had limited use in the 1960s as a fungicide. HCB is emitted to the atmosphere in flue gases generated by waste incineration facilities and metallurgical industries. HCB has an estimated 'field half-life' of 2.7-5.7 years. HCB has a relatively high bioaccumulation potential because of high lipophilicity ($\log K_{ow} = 5.5$) and long half-life in biota.

Polychlorinated biphenyls (PCBs)

PCBs were introduced in 1929 by the Monsanto Chemical Corporation and were manufactured in the USA, Japan, the former Soviet Union, and eastern and western Europe under various trade names (e.g., Aroclor, Clophen, Phenoclor). They are chemically stable and heat resistant, and were used worldwide as transformer and capacitor oils, hydraulic and heat exchange fluids, and lubricating and cutting oils.

There are 209 chlorinated biphenyl congeners, with different chlorine substitutions on the biphenyl ring. Most PCB congeners, particularly those lacking adjacent unsubstituted positions on the biphenyl rings (e.g., 2,4,5-, 2,3,5- or 2,3,6-substituted on both rings) are extremely persistent in the environment. They are estimated to have half-lives ranging from three weeks to two years in air and, with the exception of mono- and di-chlorobiphenyls, are essentially non-biodegradable in aerobic soils or sediments. Highly chlorinated PCBs have been shown to be dechlorinated in anaerobic sediments, but only where present at relatively high concentrations (>10 g/g dw). PCBs also have extremely long half-lives in adult fish.

Polychlorinated dibenzo-p-dioxins and furans (PCDD/Fs)

Polychlorinated dibenzo-p-dioxins and furans (PCDD/Fs) enter the environment as by-products of industrial processes. The most significant sources are low-temperature, incomplete incineration of wastes, and especially chlorine-containing materials such as plastics. Other major sources include thermal processes, such as motor vehicle fuel combustion in countries where leaded petrol is still used, and metallurgical industries. Pulp and paper mills using chlorine in the bleaching process have been important sources, although discharges have been significantly reduced in recent years because of the substitution of molecular chlorine by other bleaching agents. PCDD/Fs are also trace contaminants in chlorophenoxy herbicides, PCB formulations, and chlorophenol wood preservatives.

Most PCDD/F congeners, like PCBs, are extremely hydrophobic and resistant to biodegradation in soils and sediments. Historical profiles of PCDD/Fs in sediment cores from large lakes show no evidence of transformation of congeners (such as anaerobic dechlorination) over time. The tetra- to octa-chlorinated PCDD/Fs have lower vapor pressures and Henry's Law constants than PCBs and are therefore not expected to undergo long-range transport to the same extent. PCDD/Fs are rapidly photodegraded in air, water, and on surfaces. The 2,3,7,8-substituted PCDD/F congeners are known to bioaccumulate in fish and invertebrates, however non-2,3,7,8-substituted congeners (which predominate in combustion sources) are readily degraded by vertebrates.

Annex 2: People and Organizations Involved

1. Membership of the National Coordinating Committee (NCC)

	Name	Institution	Position	Address/ email
1	Mr. Panapasi Nelesone	OPM	Secretary to Government,	
2	Mr. Satalaka Petaia	POPs Project	Coordinator [from April 2005 to	popspro@tuvalu.tv
3	Mr. Melton Tauetia	POPs Project	Assistant Coordinator	menimei@tuvalu.tv or tauetia@yahoo. Com
4	Mr. Soseala Tinilau	POPs Project	Assistant Coordinator	
5	Mr. Viliamu Iese	POPs Project	National Technical Expert (NTE)	
6	Mr. Timaio Auega	DoE	Research Officer	
7	Mr. Kelesoma Saloa	IWP	Coordinator	
8	Mr. Enate E. Tauaa	DE	Acting Director	enviro@tuvalu.tv or enate@yahoo.co.nz
9	Ms. Pula Toafa	TNCW	Coordinator	
10	Ms. Siuila Toloa	Island Care	Vice President	
11	Mr. Monise Lafai	TCS	General Manager	
12	Ms.Susan Tupulaga	TWMP	Acting Coordinator	waste@tuvalu.tv or stupulaga@yahoo.com
13	Ms. Etita Molikao	ERPD	Economic Adviser	erpd@tuvalu.tv or esi_mori@yahoo.com
14	Mr. Tuilava Solofa	DoF	Information Officer	
15	Mr. Uatea Vave	DA	Senior Agriculture Officer-Extension	
16	Ms. Lina Pataia	OPM	Senior Assistant Secretary	linasatalaka@yahoo.com
17	Mr. Uale Sinapati	DM	Acting Director	uale_s@yahoo.com
18	Mr. Filipo Taulima	PWD	Director	ftaualima@yahoo.com.uk
19	Mr. Mafalu Lotolua	TEC	General Manager	
20	Mr. Mika Elisaia	BP	General Manager	
21	Mr. Malofou Auina	DRD	Rural Planner	
22	Mr. Charles Safega	DC	Director	
23	Ms. Falealili. Feagai	DH	Environmental Health Officer	

2. Consultants involved in the POPs Project

International Consultants	Activity Involved
Ludovic Bernaudat	Introduction of POPs
Dr. Frank Griffith	Independent reviewer for the National Profile of Chemical Management (NP) and the National Implementation Plan (NIP).
Melanie Ashton	Independent review of NIP and development of project profiles
National Consultants	**Activity Involved**
Mr. Kiatoa. Ulika	Legal Review; preparation of the NP and the NIP.
Mr. Lomiata Niuatui	Review of Administrative, Institutional and Technical Infrastructure; preparation of the NP and the NIP.
Ms Taloline Takuo	Pesticides
Ms Suialofa Panapasi	
Mr. Letia Kaniele	Unintentional POPs
Mr. Tito S Tinilau	
Mr. Telito Filoimea	PCBs
Mr. Utala Taloka	

3. Other People/ Organisations Consulted

Organisation	Person/Position
Kaupule o Nanumea	Mr. Lopati Samasoni, Secretary, Kaupule of Nanumea
	Mr. Eli, Ulu Kaupule (head councillor)
Kaupule o Nanumaga	Mr. Pita Polapola, Secretary
Kaupule o Niutao	Mr. Satupa -, Secretary
Kaupule o Nui	Mr. Leneuoti Matusi, Secretary
Kaupule o Nukufetau	Mr. Niusipepa Tinapa, Secretary
Kaupule o Funafuti	Ms. Helani Tumua, Secretary
Kaupule o Nukulaelae	Mr. Pene Enoka, Secretary
Tuvalu Maritime Institute	Captain Superintendent
Tuvalu Red Cross	Ms. Lilian Falealuga-Tine, Secretary General
TANGO	Ms. Anni Homasi, Coordinator.
Samuelu Builders' Hardware	Mr. Laloniu Samuelu, Owner and Manager
Princess Margaret Hospital	Dr Tekaai Nelesone
Fisheries Department	Mr. Niko Apinelu
Public Works Department	Mr. Filipo Taulima
Metrological Office	Ms. Hilia Vavae

Organisation	Person/Position
Marine Department	Mr. Uale Sinapati
Waste Management	Mr. Susan Tupulaga
ICT Department	Mr. Opetaia Simati
Energy Department	Mr. Elisaia Taape
USP	Mr. David Manuela, Center Director
TUFHA	Ms. Emile Kopke, Coordinator
TCS	Mr. Monise Lafai, General Manager
NAFICOT	Mr. Tautu Teafa, Acting General Manager
DBT	Mr. Taukave Poolo, General Manager
NBT	Mr. Siose P Teo, General Manager
TTC	Mr. Simeti Lopati, General Manager
TEC	Mr. Mafalu Lotolua, General Manager

Organisation	Person/Position
TMC	Mr. Melali Taape, General Manager
BP	Mr. Mika Elisaia, General Manager
Funafuti Fusi	Mr. Iosia Apelu, Manager
Kaupule o Funafuti	Helani Kaitu, Secretary
Asivai Workshop	Ms. Asiasiga Sio
Mautama Motor & Parts Services	Mr. Ioapo Tapu, Manager
Halo's workshop	Mr. Halo Tulivai (MP), Manager
Fiamalu's Joinery workshop	Mr. Fiamalu , Manager
Mama Station	Mr. Taupili, Manager
Taake Refregiration/ Air Conditioning	Mr. Taake Samuelu, Manager

Annex 3: Proposed Strategic Plans

Strategy 1: Strategy for National Coordination, management, reporting, information exchange and public information and awareness and education

Refer 3.2.1

Activities	Key Contributing Agencies*	Timeline (duration)	Performance Indicators	Cost Estimate (USD) & Source	Resources Needed
Objective 1: To employ permanent national coordinator for implementing the NIP and related chemical initiatives. Lead Agency: DE					
Nomination of Coordinator	DE* NCC	By the completion of the NIP	MOU signed with funding agency Coordinator engaged and commences work.	External:$ 65,000	As presently available in DE – office equipment, as with the NIP project.
Objective 2: Maintain a high level of national awareness and understanding of POPs and related hazardous chemicals, including an understanding of the potential health, environmental and economic impacts, and of specific agency roles in implementing the NIP. Lead Agency: DE					
Establish and maintain a POPs library and database of literature materials related to chemical management, chemicals, including POPs	DE	Month 1 and then ongoing	Library and database regularly updated	External $8,000	IT, Officer, IT supplies, research assistants
Continue to provide information support to main chemical users including secondary and tertiary schools and encourage including units of chemical management especially related to POPs in curricula	DE	Month 2 and 3 then ongoing	Regular meetings with chemicals sector Information packs on chemicals distributed and used in schools	External: $4,000 External $4,000	Education material development Postage and delivery costs
Convene interagency and multi-stakeholder workshops to identify roles and how NIP implementation activities can fit into existing and future sectoral strategic plans	DE, nominated agencies and TANGO	Month 3	NIP activities linked to other development activities and strategic plans	External $3,000	Consultative meeting costs (venue, refreshments) x 3

Activities	Key Contributing Agencies*	Timeline (duration)	Performance Indicators	Cost Estimate (USD) & Source	Resources Needed
Annual meeting of stakeholders to review progress and set objectives and activities for the following year	DE	Annual basis	One meeting held	Internal $10,000	Meeting costs (venue, refreshments), travelling costs, subsistence allowances.
Objective 3: Sustained, effective gathering and sharing of information and reporting on, NIP implementation, nationally and internationally. Lead Agency: DE					
Gather, disseminate and store information on POPs and interpret it for the Convention	DE	Month 1 and ongoing	Regular flow of information to and from the Convention Secretariat	Internal: $2,000	IT support to manage data.
Develop a recommendation to become a Party to the Rotterdam Convention on Prior Informed Consent;	DE	Month 2	Recommendation delivered to Minister	External: $2,000	Consultative meeting costs
Continue the active involvement of Tuvalu as a Party to the Convention and to coordinate across government, to gather, disseminate and store information on POPs	DE and nominated agencies	Month 1 and ongoing	Tuvalu nominated to technical bodies and working groups including the POPRC	Internal: $1,500	Consultative meeting costs
Report on activities as determined by COP	DE	Ongoing	Reports prepared and submitted	External: $2,000	Report review (preparation by POPs Officer)

Strategy 2: Proposed Work Plan for Increased Capacity

Refer 3.2.2

Activities	Key Contributing Agencies*	Timeline (duration)	Performance Indicators	Cost Estimate (USD) & Source	Resources Needed
Objective 1: Train staff on effective control of import, enforcement of import restrictions, detection of illegal imports and on managing information on pesticide imports. Lead Agency: DE; with involvement of DA and DC.					
Staff training for effective control over imports and use of pesticides	DE* DA DC	Months 4-6	At least 3 workshops sessions held	External : $18,000 Internal: $1,000	Consultancy costs; Local venue for consultation;

Staff training for regulation and management of pesticides, including enforcement of the Pesticides Act;	OAG	Month 6		External: $4,000 Internal: $1,000	OAG officer; Directors of DA & DE; Local venue for consultation; NCC members- presentations/ o/head projector; refreshments; training materials.

Strategy 3: Proposed Work Plan for the Reduction and Elimination of Intentional Releases of POPs pesticides

(Annex A, Part I, POPs and other pesticides (Article 3)) Refer 3.2.3

Activities	Key Contributing Agencies*	Timeline (duration)	Performance Indicators	Cost Estimate (USD) & Source	Resources Needed
Objective 1: Train DE staff in OH&S associated with hazardous waste handling; Lead Agencies: DE and DA					
Determine which staff in which sections of the government need training (also covering objective 2 below)	DE	Months 3	Staffs identified	Internal: $1,000	National Coordinator
Determine the most effective training methods and materials		Months 3	Effective training methods and materials identified and consultant identified	Internal: $4,000	National Coordinator
Train staff in OH&S of hazardous waste		Month 4	Training undertaken, trainees certified.	External: $15,000	Consultant
Objective 2: Repackage chemicals on Vaitupu in the Elisefou agriculture store and temporarily store them safely Lead Agency: DA					
Organise travel via vessel to Vaitupu	DE	Month 4	Arrival in Vaitupu	Internal: $1,000 External: $1,000	Vessel charter or passage on passenger ferry
Consult community on issues at the Elisefou chemical store		Month 4	Community agreement to the clean up	Internal: $300	Information on the dangers of chemicals translated into local language
Repackage chemicals		Month 4	Chemicals safely repackaged	External: $30,000	Consultant (same individual as OH&S trainer) Personal protective equipment
Objective 3: Ship chemicals to Funafuti for safe store in the hazardous waste store. Lead Agencies: DA and DE					
Organise safe shipping of chemicals from Vaitupu to Funafuti	DE	Month 5	Chemicals shipped to Vaitupu	External: $10,000	Charter vessel, or rerouting of passenger vessel
Store chemicals in hazardous waste store		Month 5	Chemicals safely stored in secure location	Internal: $1,000	DE staff with the assistance of hazardous waste consultant.
Explore options for disposal – convene meeting with in-country donors and contact other donors		Month 5	A donor identified to fund off-shore disposal	Internal: $1,000	DE staff with the assistance of hazardous waste consultant.

Strategy 4: Proposed Work plan for the Reduction and Elimination of Intentional Releases of POPs (PCBs)

(Annex A, Part II, PCBs (Article 3) Refer 3.2.4

Activities	Key Contributing Agencies	Timeline (duration)	Performance Indicators	Cost Estimate (USD) & source	Resources Needed
Objective 1. Train staff on the use of field test kits, test in-use transformers and switch gears and quantify the amount of PCB contaminated oil (if any) remaining in Tuvalu;					
Training on the use of field test kits and in collection of soil samples	DE and TEC	Month 5	DE and TEC staff trained in use of field test fits and soil sample collection	External: $15,000	Consultant and procurement of field test kits
Sampling of online transformers and switch gears		Month 5	Electricity turned off and online transformers and switchgears sampled	Internal: $1,500	Consultant with the assistance of TEC and DE staff
Extraction of laboratory samples from field-positive samples, analysis in NZ or Australia		Months 5 and 6	Samples collected from positive transformers and switchgears	External: $3,500	Laboratory analysis and couriers
Report, interpreting the status of PCB-contaminated equipment.		Month 6	Report and recommendations received	External (included in consultant fee, above)	Consultant (as above)
Objective 2. Sample soil in the immediate vicinity of PCB-contaminated oil, and test the samples for PCBs.					
Collection of soil samples, in vicinity of PCB-contaminated equipment	DE	Month 6	Soil samples sent to laboratory for analysis	External: $2,000	Laboratory analysis and couriers
Report interpreting the contamination status of soil in the vicinity of contaminated equipment		Month 7	Report and recommendations received	External: $2,000	Consultant
Objective 3. Establish and implement a system of safe handling, storage and transport of PCB contaminated equipment, including capacitors.					
Develop a system for taking PCB-contaminated transformers offline and safely storing PCB-contaminated oil	DE/TEC	Month 7	System developed, including projected timeframe	External: $10,000 Internal: $1,000	Consultant and storage drums
Implement system – including collection and storage of capacitors		Month 8 - 20	All contaminated transformers and switchgears, taken offline and oil extracted	Internal: $3,000	National coordinator
Objective 4. Export, eliminate and destroy all PCBs, PCB-containing materials and PCB waste no later than 2010.					

Activities	Key Contributing Agencies	Timeline (duration)	Performance Indicators	Cost Estimate (USD) & source	Resources Needed
Analyse options for PCB waste collection and disposal, including existing environmental financing support facilities.	DE	Month 20-24	Options evaluated	External: $2,500	Consultancy
Approach bilateral donors directly including NZAid, AusAID and AFD to request assistance.		Month 21-23	Willing donor identified	Internal: $1,000	
Implement PCB clean up and export PCB contaminated oil and PCB-containing materials for disposal.		Month 26	PCBs exported	External: $100,000	Consultancy, shipping fees, destruction

Strategy 5: Proposed Work plan for the Reduction and Elimination of Unintentional Releases of POPs

(Dioxins and Furans, Article 5)- Refer 3.2.5

Activities	Key Contributing Agencies*	Timeline (duration)	Performance Indicators	Cost Estimate (USD) & Source	Resources Needed
Objective 1: Include methods to reduce uPOPs in related national policies including the National Solid Waste Management Strategy, Vehicle Emissions Action Plan and the programme on medical wastes. Lead Agencies: DE					
Provide information to the solid waste management officer on uPOPs, to develop village consultation for awareness and alternatives to burning;	DE	Months 1 to 6	Consulation programme developed	Internal: $2,000	National coordinator, venue for preliminary stakeholder meetings
Work with the solid waste management officer to train rubbish collectors and landfill management on waste management;	DE	Months 7 to 8	Training undertaken for waste staff	External: $10,000	Training facilitators, venue for preliminary training
Work with the solid waste management officer to complete collection of information on quarantine and medical waste volumes and management options; and	DE	Months 4 to 5	Accurate waste volumes collected	Internal: $1,000	IT for database management
Provide information on uPOPs and contribute to the finalisation of the system in Department of Primary and Preventative Health (Environmental Health Services) to consider best environmental practice for medical waste in Tuvalu.	DE in consultation with Department of Health	Months 7 to 8	Information provided and included in the Environmental Health Services System	Internal: $1,000	National coordinator
Assist Falekaupule/ Kaupule to issue resolution and/or enact by-laws to promote environmental, health and safety for dioxins and furans, through promoting safer waste burning; and	DE with Falekupule/Kaupule	Months 9 to 20	Resolution developed and enacted	External: $10,000	Consultant Legal drafters

Activities	Key Contributing Agencies*	Timeline (duration)	Performance Indicators	Cost Estimate (USD) & Source	Resources Needed
Coordinate with the Department of Education to integrate in the curricula and/or extra curricula activities regarding the environmental and health impacts of dioxins and furans and to promote safe burning.	DE	Months 8-10	Safe burning taught in schools	External $3,000	Consultant to develop resource material, and printing of posters
Public awareness of economic and environmental costs of poor burning of vehicle fuel;	DE and Department of Transport	Months 1-6	Increased awareness, decreased poor vehicles on the road	External: $3,000	Resource material and advertising costs

Strategy 6: Proposed Work Plan for the Reduction and Elimination of Releases from Stockpiles and Wastes

(Article 6)- Refer 3.2.6

Activities	Key Contributing Agencies*	Timeline (duration)	Performance Indicators	Cost Estimate (USD) & Source	Resources Needed
Objective 1: Train staff in the assessment of contaminated sites using the field-based Risk Screening System and environmental sampling Lead agency: DE					
Establish local capacity for the identification and management of contaminated sites, via classroom and field training by end of 2008	DE	Months 3-7	Local staff identified and trained	External: $25,000	Training Facilitator/s; Training costs (venue, refreshments, travel)
Objective 2: To conduct detailed assessments of potentially contaminated sites in Tuvalu by 2008 and develop remedial action for such sites as necessary Lead agency: DE					
Undertake further assessment of potential contaminated sites identified by SPREP POPs in PICs report by 2008, using the Risk Screening System to rank sites as high medium and low priority and field sampling;	DE	Months 2-6	Potentially contaminated sites assessed	External: $25,000	Consultancy, report preparation
Sign and fence off any contaminated sites by 2009;		Months 7-12	Contaminated sites fenced off from public access	External: $10,000	Fencing equipment
Obtain necessary safety equipment;		Months 1-2	Equipment acquired	External $7,000	Freight and equipment
Develop management plan for highly contaminated sites by end of 2008;		Months 7-12	Management Plan developed	External: $ 13,000	Consultancy, meeting costs (venue, refreshments, stationery)
Develop cost estimates and obtain funds by mid-2009 to remediate or clean up contaminated sites;		Months 13-18	costs estimate prepared	External:$ 4,000	Consultancy
Public awareness to help identify additional contaminated sites.		Months 7-12	Public awareness carried out nationally and at communities adjacent to contaminated sites	External: $ 3,000	Public awareness campaign costs

Strategy 7: Proposed Work Plan for Research, Development and Monitoring

(Article 11)- Refer 3.2.7

Detailed List of Activities	Key Contributing Agencies*	Timeline (duration)	Performance Indicators	Cost Estimate (USD) & Source	Resources Needed
Objective 1: Train Department of Environment staff in the collection of air and human breast milk samples, and in the interpretation of results; and assist USP in sample collection Lead Agency: DE, DA					
Staff training and sample collection	DE/USP	Months 10-11	Samples collected	Internal: $1,000	USP project visit to Tuvalu

Annex 4: Stakeholder Analysis

Stakeholders	Characteristics (socio-economic, structure, organization, status, attitudes)	Problems and interests (unsatisfied needs, interests, objectives)	Potentials and difficulties (resource endowment, knowledge, experience)	Implications for the project (support resistance)
Government agency staff	Several agencies represented on the NCC, owing to the cross-sectoral nature of the POPs issue – includes Departments of Environment, Health, Public Works,	Lack specialist training and knowledge to deal with issues related to the import, management and the assessment of the impacts of chemicals	Familiar with the use of chemicals in various departments including health and agriculture.	Supportive of project, however.
Industry/private sector	Limited industry in Tuvalu, BP the main company.	BP has been cooperative with the POPs Project, works closely with government.	BP helpful with waste oil recycling, offering to collect non-contaminated oil as part of their waste oil for export.	BP – expected to support all POPs initiatives.
State-owned enterprises	Tuvalu Electricity Commission (TEC)	TEC has limited resources.	TEC have been consulted throughout the NIP process, are represented on the NCC, will be required to turn power off to allow sampling of transformers.	TEC likely to be concerned about financial implications of taking transformers offline permanently, due to high replacement cost. Flushing of transformers and switchgears and reuse will need to be considered.
Funafuti community	Funafuti is the most populated town in Tuvalu and residents are crowded into a small land area.	There is significant environmental concern among the population, particularly about solid waste.	People live in close proximity to each other and productive land is scarce.	Supportive of efforts to clean up environment and potential risks to the environment. Likely to be very concerned about any contaminated sites identified, due to scarce land availability.
Vaitupu community,	Represents a small isolated	Aware of chemical store,	Some historical knowledge	Supportive of chemical

represented by Kaupule of Vaitupu	community.	supportive of clean up	of the chemicals and where they were used, among older members of the community	repackaging and site clean up. May provide additional anecdotal historical information.

Annex 5: Logframe Analysis

Intervention logic	Objectively verifiable indicators	Sources of verification	Assumptions and risks
Overall objective			
Development objective	To protect human health and the environment, by reducing and eliminate production, uses, and release of POPs and increasing capacity development in the sound management of chemicals.	POPs tracking tool and independent project evaluations.	
Immediate objective	Sustainably reduced POPs use and releases, through phase-out, destruction in an environmentally sound manner, and use of substitute products and alternative processes, that lead to reduced environmental and health risks resulting from POPs.	- POPs phased-out from use (tons and cost per ton per compound) • POPs destroyed in an environmentally sound manner (tons and cost per ton per compound and per mode of destruction) • Reduced exposure to POPs, measured as number of people living in close proximity to POPs wastes that have been disposed of or	
Output 1: National coordination, management, reporting, information exchange and public information and awareness and education			
Recruit National Coordinator	National Coordinator employed	POPs office exists with 1 full time staff member, in Department of Environment	Office facilities provided by Department of Environment
Output 2: Increased capacity			
Train staff on effective control of import, enforcement of import restrictions, detection of illegal imports and on managing information on pesticide imports	Consultant TORs developed for training Invitations sent to relevant staff	Channel of communication, minutes of meetings, recruitment of experts, training reports	Capacity and will of staff to partake in training
Output 3: Reduction and Elimination of Intentional Releases of POPs pesticides			
- Train DE staff in OH&S	Consultant TORs developed for training	Channel of communication,	Capacity and will of staff to

associated with hazardous waste handling - Repackage chemicals on Vaitupu in the Elisefou agriculture store and temporarily store them safely - Ship chemicals to Funafuti for safe store in the hazardous waste store	Invitations sent to relevant staff Vessel to Vaitupu arranged	minutes of meetings, recruitment of experts, training report, photographs of clean up, receipts for vessel charter/passage	partake in training Availability of vessel for charter/passage
Output 4: Reduction and Elimination of Intentional Releases of POPs (PCBs)			
- Train staff on the use of field test kits, test in-use transformers and switch gears and quantify the amount of PCB contaminated oil (if any) remaining in Tuvalu - Sample soil in the immediate vicinity of PCB-contaminated oil, and test the samples for PCBs - Establish and implement a system of safe handling, storage and transport of PCB contaminated equipment, including capacitors - Export, eliminate and destroy all PCBs, PCB-containing materials and PCB waste no later than 2010	Consultant TORs developed for training, sampling and establishment of PCB contaminated safe handling system Invitations sent to relevant staff Testing and sampling equipment ordered Shipping and destruction arranged	Channel of communication, minutes of meetings, recruitment of experts, training report, photographs of clean up, receipts for vessel charter/passage, Waigani documentation and import permits for equipment, destruction certificate	Capacity and will of staff to partake in training Availability of vessel Agreement of recipient country and destruction facility to import waste
Output 5: Reduction and Elimination of Unintentional Releases of POPs			
- Include methods to reduce uPOPs in related national policies including the National Solid Waste Management Strategy, Vehicle Emissions Action Plan and the programme on medical wastes.	Measures to reduce uPOPs in the final iterations of the Solid Waste Management Strategy, Vehicle Emissions Action Plan and the programme on medical wastes.	Channel of communications, minutes of meetings, copies of the Solid Waste Management Strategy, Vehicle Emissions Action Plan and the programme on medical wastes.	Strategies completed prior to POPs coordinator beginning work
Output 6: Reduction and Elimination of Releases from Stockpiles and Wastes			
- Train staff in the assessment of contaminated sites using the field-	Consultant TORs developed for RSS training and environmental sampling	Training reports and feedback questionnaires	Capacity and will of staff to partake in training

based Risk Screening System (RSS) and environmental sampling - Conduct detailed assessments of potentially contaminated sites in Tuvalu by 2008 and develop remedial action for such sites as necessary	Invitations sent to relevant staff Sampling vessels and equipment ordered Shipping and destruction arranged	Laboratory results Detailed assessment reports	
Output 7: Continued research, development and monitoring			
- Train Department of Environment staff in the collection of air and human breast milk samples, and in the interpretation of results; and assist USP in sample collection	USP project staff undertake sampling in Tuvalu	Copies of email communication Training report Laboratory results Air and breast milk assessment report	Sufficient lactating mothers willing to take part USP undertake sampling in Tuvalu

Annex 6: Preliminary Inventory on Persistent organic pollutants and Toxic wastes in Tuvalu:

Identification of hot spots and other possible sources of POPs and toxic wastes in Tuvalu.

General Introduction

Tuvalu is one of the countries that ratified the Stockholm Convention, which enforce the elimination and termination of the chemicals that are persistent in the environment. These chemicals can accumulate in fatty tissues of living things and can have drastic effects on the environment and people. The Stockholm convention listed 12 chemicals that were proven to be persistent and caused damages for human and the environment. The list below contains the twelve chemicals (dirty dozen):

(1) Aldrin
(2) Chlordane
(3) DDT
(4) Dieldrin
(5) Endrin
(6) Heptachlor
(7) Hexachlorobenzene (HCB)
(8) Mirex
(9) Toxaphene
(10) Polychlorinated Biphenyls (PCB)
(11) Dioxins
(12) Furans

Nine of the chemicals (1-9) identified are pesticides or insecticides. The chemical number 10 (PCB) is a heat exchange fluid. The two compounds 11 and 12 are produced unintentionally due to incomplete combustion, smoke from tobacco and wood and automobile exhaust.

Tuvalu has a commitment to fulfill all responsibilities under the Stockholm convention. Therefore, there is a need to identify all production, importation, uses, monitoring and disposal of persistent organic pollutants in the country.

Previously there was only one POPs inventory done in Tuvalu. It reported the presence of PCB, and other hazardous wastes in the country. This baseline survey did not find any agricultural chemicals, or covered unintentional release of POPs in Tuvalu. Due to the limitations of the above survey, there is a need to conduct a preliminary survey of all possible sources of POPs in Tuvalu. Based on the 1998 survey, we assume that there are no intentional releases of POPs except PCBs in Tuvalu. We broaden the survey to cover all hazardous wastes. From experience, all wastes produced in Tuvalu can be a source of dioxins and furans because of high frequency of open burning of wastes. Hence this survey not only specifically focused on twelve dozens, it was expanded to cover all possible release of hazardous wastes.

1.1 Tuvalu.

Tuvalu is an atoll island country in the South Pacific. It is approximately about 1,308 Km south of Tarawa (Kiribati) and 1027Km north of Suva (Fiji) (Seluka, 1997) (Figure 3.1).

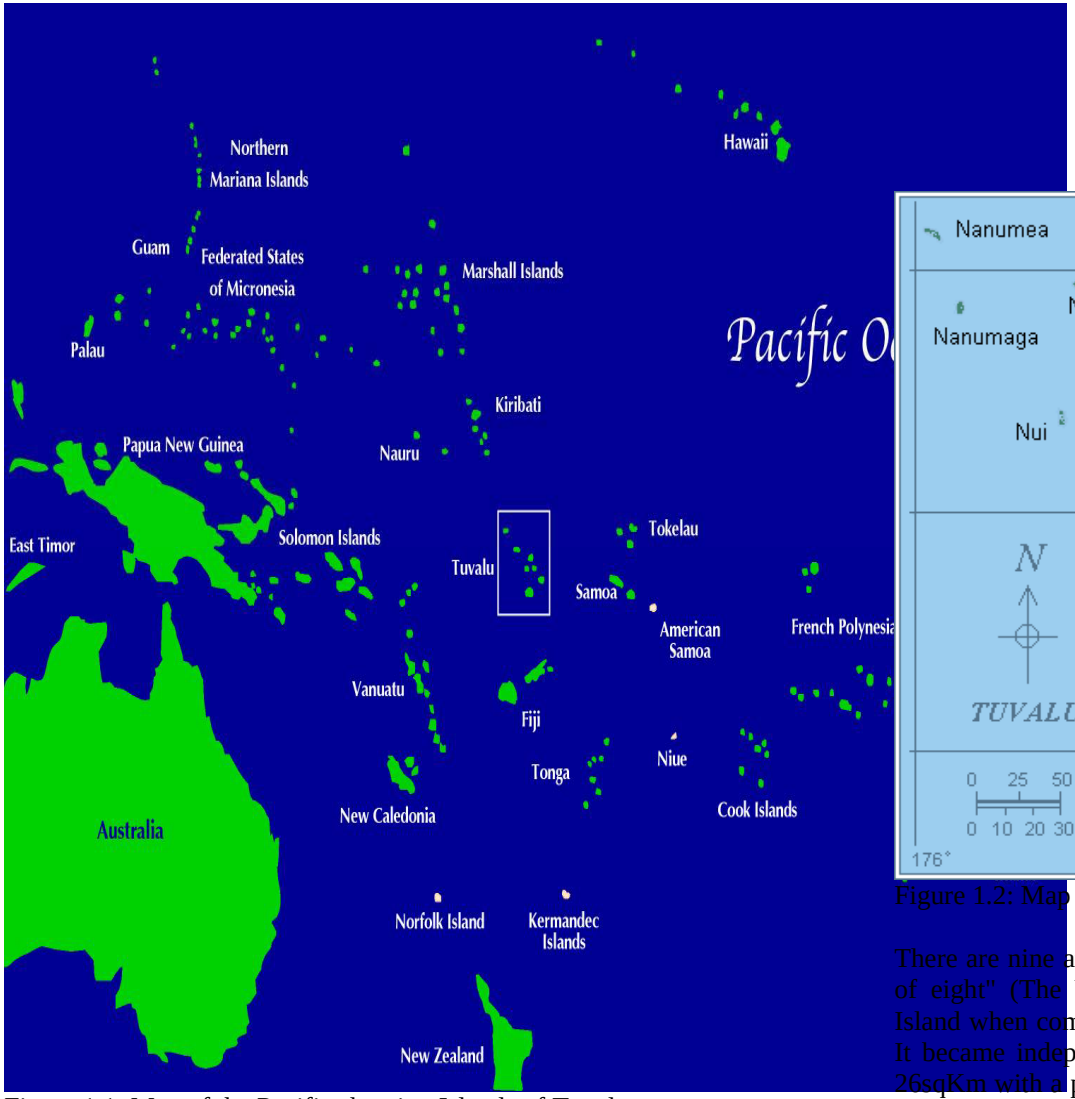


Figure 1.1: Map of the Pacific showing Islands of Tuvalu.

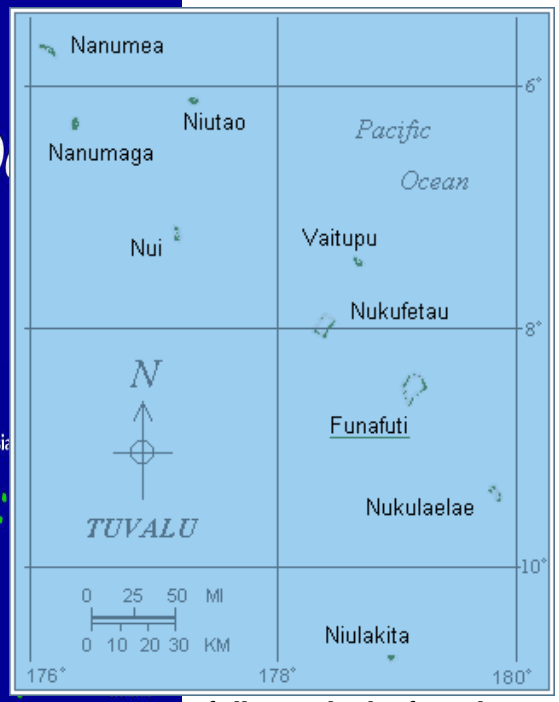


Figure 1.2: Map of all nine islands of Tuvalu.

There are nine atolls in Tuvalu, although its name literally means "group of eight" (The World-guide book 2004). It was formerly called Ellis Island when combined with Gilbert Islands (Kiribati) under British rules. It became independent in 1978. The total landmass of Tuvalu is about 26sqKm with a population of 11,468 by July 2004 (CIA-Factbook 2004).

The highest point is estimated to be 5 meters above sea level. The temperature fluctuates all throughout the year. The highest temperature is usually around 33^{o}C, but sometimes it reaches around 36^{o}C. The lowest temperature is usually around 20^{o}C (McLean and Hoskin 1991). There is no well-defined wet and dry season in Tuvalu because rains and sunshine is experienced throughout the year. But heavy and frequent rainfalls are usually experienced from October to April (Cyclone season) while droughts and sunshine prevailed from May to September (Seluka 1997). The soil all throughout Tuvalu is typical of an atoll island. There are three main types of soils according to Caiger (1987). They are coralline soils, phosphate soils and improved soils for plant cultivation. It has high pH and also $CaCO_3$ therefore other essential minerals for plant growth are in very limited amounts. Thus the soil is very poor in fertility (Overton and Thaman 1999).

Since independence, the government of Tuvalu tried to balance its economic growth and the resources she has. The peoples' income comes from employment in the government and very limited private sectors. Most of the money flowing in the country comes from migrant relatives and Tuvaluan seafarers working on ships overseas. Another source of income for people is the selling of fish, coconuts and handicrafts. The primary source of foods and money for the Tuvaluans is based on production of subsistence farming and fisheries from villagers (outer islands). The main staple crop or source of starch for islanders is the giant swamp taro. Other food sources like bananas, breadfruit, sweet potato, and taro are widely cultivated around the atolls. The major sources of proteins are the fish and pork. In outer island atolls, people also favor the consumption of sea birds. Apart from these traditional sources of foods, there is a higher consumption and dependency on rice, flour and imported expensive meats (Seluka 1997). The hazards that are affecting the people of Tuvalu ranged from Natural disasters like cyclones and droughts to well known phenomenon as El Nino, Global warming and rising of the sea level. Since the atolls are very low, they are more vulnerable to disasters.

Tuvalu is a developing nation which depends so much on imported materials for building infrastructures, household items, transportation, electricity and food. The influx of all imported items is accompanied by many diseases and social issues. Since Tuvalu has a small land mass, disposal of wastes is always a continuous problem despite the effort of many government and non government organizations to minimize it. In terms of chemicals, there are no manufacturers in Tuvalu, therefore all chemicals used by the hospital departments, laboratories (Schools), agricultural department, and other institutions are all imported from Fiji, Australia and Asian countries. It is estimated that almost about 90% of imported items turn into waste in 2 to 3 years from importation. This raises the need to identify the uses, dumping sites and treatment of wastes in order to specify any environmental effects and impacts of POPs and hazardous wastes on Tuvaluans and the environment.

All islands of Tuvalu were covered during this preliminary inventory survey. For the capital (Funafuti), the survey was carried out on all stakeholders that were listed under the 1998 survey and also additional institutions. Outer island report is specific for each island.

1.2 Limitations of the report.

All findings presented in this report are strictly based on conservative estimates because we do not have testing kits to conduct on site testing of materials. There are no proper records stored by respective department, thus making data collection very difficult and inaccurate.

2. Pesticides/insecticides Survey in Tuvalu.

2.1 INTRODUCTION

Pesticides and Insecticides are known as chemicals that are used for killing pests and insects that eat food crops. This project was basically based on pesticides and insecticides that are under the Stockholm convention. These are the names of the 9 pesticides that under the Stockholm Convention and have used in the past years:

1. Endrin
2. Dieldrin
3. Aldrin
4. Chlordane
5. Heptachlor
6. Toxaphene
7. Mirex
8. DDT (dichlorodiphenyltrichloroethane)
9. Hexachlorobenzene

This report provides general information about pesticides/insecticides in Tuvalu from the past 20 years until now. The only survey that looked at Agricultural chemicals in Tuvalu was conducted by SPREP in 1998. It reported no Agricultural chemicals used or in stored in Tuvalu. As personally experienced, agricultural chemicals were present and are currently applied around Tuvalu.

The basic objectives of this survey are:
- Review and summarize the production, use, import and export of the chemicals listed in Annex A
- To gather information on stockpiles and wastes containing, or thought to contain POPs pesticides.
- To identify gaps in information required to complete the assessment.
- To identify whether the current situation meets the requirements of the Stockholm convention and detail areas where it does not.

2.2 METHODOLOGY

There was an urgent need to assess and find out the past and current information about pesticides and insecticides importation, used and disposal in Tuvalu. This information will help to create the inventory and also to formulate the NIP as required by the Stockholm convention.

2.2.1 Questionnaire

A questionnaire (Appendix 1) was designed for each department based on the objectives mentioned before. The questionnaire was used as an outline for interview with respective department officers. We were also allowed to visit storage sites, and took photographs of their premises. The information in this report was obtained from the following officers:

- Mr Itaia.Lausaveve – Director of Agriculture
- Mr Matio and Mr Peleti – Officers, Agriculture Department
- Mrs Falealili.Feagai. – Health Inspector
- Mr Launiu.Pelosi - Acting Manager, Tuvalu Cooperative Society (TCS)
- Mr Lee – Taiwan Project

2.2.2 Site selection and visits

Different sites/departments were identified based on the prior knowledge that they are importing, selling, and use pesticides/insecticides in Tuvalu. The departments selected were:

- Agricultural Department
- Public Health Deaprtment (Princess Margaret Hospital)

- Tuvalu Cooperative Society (TCS)
- Taiwan Project

2.2 AGRICULTURE DEPARTMENT

There is no production of pesticides in Tuvalu, all stocks are either imported or donated by the government and private organizations. The agricultural department provided the names of the chemicals they used in the past and also at present.

2.2.1 Chemicals used in the past.

Table 1: The two agriculture officers gave us suspected pesticides/insecticides that their department used in the past years

NAME of PESTICIDES/INSECTICIDES	YEAR	INSECTS	
Carbary	Not Recorded	Fumigation	Steam stearilisation
Chlordane	Not Recorded	Chemical dips sprays	Vapour heat
DDT-Malathion	Not Recorded	Cold treatment	Hot water dip
Lindane	Not Recorded	Refrigeration plus fumigation	Dry heat chemical dips
Malathion	Not Recorded	Vapour heat	Chemical dips
Malathion Carbaryl	Not Recorded	Quick freeze	Dry gas
Methoxychlor	Not Recorded	Aerosols	Dusts
Vapam	Not Recorded	Micronised dust	sprays

2.2.2 Chemicals at present

Table 2: List of chemicals currently used bu the department

NAMES	USED /FUNCTION	ACTIVE INGREDIENTS	STOCK /DISPOSAL	NET WEIGHT	PL. IM
1.Bactro Mat (M-E)	Kill male Dacine fruit Flies, toxic to fish and aquatic organisms	Not Recorded	In a box in the cupboard	Not Recorded	Au –N Zea
2. Ethylactate CH3. C00, C2H5 = 88.11		Non volatile matter….0.01 Acidity Cas CH3 (00H)…0.01 Water…….0.3	In the cupboard	500 m l	No Rec
3.CAPTAN -general garden fungicide	Control many fungous diseases on fruit, trees, vegetables, ornamentals and seedlings (more improved)	500g/kg captan in the form of a wettable powder	In the cupboard	150 grams	Au Ne Zea
4. PRO-GIBB PLUS -Gibberellic Acid		Gibberellin A3….10 %w/w Inert Ingredients ….90% ww	In the Cupboard	160 grams	No Ch US

		Contain a total of 16g of Giberellic Acid			
5. BLITZEM	Pellets kills slugs and snails	30g/kg metaldehyde in form of a pellet	In the cupboard	500 grams	Auckland, New Zealand
6. Insect Trap Coating	Effective in trapping and monitoring flies, ants, and other flying and crawling insects	Not Recorded	In the cupboard	156 grams	N R
7.Methyl Engenol -Posalure ME	Kills Fruit Flies	Not Recorded	In the cupboard	1 Kilo	Not Recorded
8. CUELURE (p-Acetoxyp-henylbutanone – 2)	Insect pherome Grade	Not Recorded	In the cupboard	1 Kilo	Not Recorded
9. Lane Roger Insecticides	Certain insects in fruits, vegetables, pastures, cereals, incerne and seeds	Not Recorded	In the cupboard	600g/l Dimethoate	Not Recorded

		specified as crops				
10. Rat (wax) (Bromadiol wax bait)	bait ine	To control rats	Not known			Ne Zea (Er Prc

CAPTAN chemical stored in agricultural sites

Chemicals stored in Agriculture department

2.2.3 Problems encountered

The first problem was the inconsistency of the information given by different personnel. Some mentioned there were no chemicals while others showed us the storage sites and provided the needed information. The second difficulty was recalling the names of chemicals and also the dates and the places of uses because there are no records of pesticides/insecticides used in Tuvalu.

2.2.4 Additional information

The department used orthene to control taro leaf hopper (*kinauele*). The weed killer was used on Funafuti and Vaitupu. The malathion was applied to control mosquitoes when needed. The officers forgot the names of the chemicals that were donated from the Secretariat of the Pacific Community (SPC) in 1997 to control the African snail on Vaitupu.

The Agricultural department is no longer importing pesticides/insecticides because of financial constraints. They are relying on chemicals supplied by the Public Health department to control pests/insects when the need arises. For example, when the coconut scale destroyed coconut productions on Nanumaga Island and Vaitupu Island, the public health department provided chemicals to slow down the pest. When the agricultural officers sprayed the chemicals they always wear protective gears. There are no records or reports of pesticides/insecticides poisoning both on agricultural officers and general population. The department keeps their old/expired stocks in cupboards in their old office (opposite the wharf) without future disposal plans.

2.2.5 Alternative plans

As explained earlier, financial scarcity stopped the importation of pesticides and insecticides by the agricultural department. Since the outbreak of the coconut scale on Nanumaga Is and Vaitupu Island, few chemicals (from Public Health Department) were used with moderate effects. The SPC assisted the Agricultural efforts and proposed the use of a biological agent to control the pest. Unfortunately, there is little success from this approach. The department also employed other methods like pest isolations and public awareness programs to control the spreading of the pest in Vaitupu. This is more effective.

2.3 PUBLIC HEALTH DEPARTMENT

2.3.1 Chemicals currently used

NAMES	USED /FUNCTIONS	ACTIVE INGREDIENTS	IMPORT /DONATED	STOCK /DISPOSAL
1. FICAM.	Kills adult		Donated -	In a box, in

2. Malathion	Kill mosquitoes and other insects	Contain 500g/litre maldison in the form of an emulsifiable concentrate	Donated WHO	In a box in their store room
3. Vecto-Bac Control	A biological insecticides containing *Thuringiensis* subspecies *israelensis* for the control of mosquito larvae - larvaecide control	300 International Toxic Units/mg *Bacillius thuringiensis* subspecies *israelsis* (serotype H14) in the form of a water dispersible granule	Donated WHO	In a cupboard
4.Rat Bait	Kill Rats Rodenticides	-	Donated WHO	In a box in their store room
5.Air Craft Insecticides -Pre Spray	Aerosol Insecticides for Cabin Spraying	20g/kg Permethrin 25:75		On the table
6.Air Craft Spray -top of descents	Aerosol Insecticides for Cabin spraying	20g/kg d-phenothrin 20:80		On the table
7.Blue Water -Calcium Hypochlorite, Hydrated 70 %	Kills and control algae and bacteria	650g/kg Calcium Hypochlorite	Donated WHO	In their office

2. Malathion	Kill mosquitoes and other insects	Contain 500g/litre maldison in the form of an emulsifiable concentrate	Donated WHO	In a box in their store room
3. Vecto-Bac Control	A biological insecticides containing *Thuringiensis* subspecies	300 International Toxic Units/mg *Bacillius thuringiensis*	Donated WHO	In a cupboard

2.3.2 Problems encountered

According to the officer interviewed, the use of chemicals as a Public Health solution to decrease and eliminate pests, insects and vectors originated around 1975. But this is hard to confirm because there are no records of chemicals used in previous years available.

2.3.3 Additional Information

Most of the pesticides/insecticides used were donated by the WHO. They were also used as suggested by the WHO pesticides regulations/guidelines. The malathion is usually sprayed twice a year on Funafuti. Prior to that, Public awareness announcements are always done to raise awareness about the proposed activity and its side effects. The health officers always wear protective gears to avoid any discomfort the chemicals might cause. Up to this time, there are no reported cases of poisoning from chemicals used by Public Health Department. The empty containers are always transferred to the Waste Management for disposal.

The Public Health Department always supplies chemicals to the agricultural department when they need assistance.

2.3.4 Alternative Plans

DDT was never used as a Public Health vector control in Tuvalu. This contradicts with the 1998 Survey which reported the use of DDT about 17 years ago. The Public Health Department chemicals have been used in Tuvalu for more than 20 years. Since most of the supplies were donated by the WHO, cost is not a problem. There is a need to develop proper monitoring plans especially between the Agricultural department and the Public Health department. The quote below summarizes the views of the Public Health officer about the use of chemicals.

> "Even though we faced problems from those pesticides/insecticides but we still need them on the other hand, without those pesticides/insecticides what can we do to control rats, mosquitoes and other pests and insects which harmful to our lives and our environments"

2.4 TUVALU COOPERATIVE SOCIETY (TCS)

According to the source, TCS imported pesticides/insecticides before he came to work there in 1991. The pesticides/insecticides they have now are morteins, mosquito coils and rat killer (baits). There are no complaints from customers about sickness or allergy caused by morteins or mosquito coils. The shop supervisors look after those pesticides/insecticides when they are on different island stores. If they get expired, the TCS management will seek advice from other departments like Environment and Waste Management Project, POPs Project, but discourage burning. So far they did not face such problems. The TCS imports pesticides/insecticides according to the demand, there is no department supervising the amount of pesticide/insecticides they import.

In addition, the source explained that people really need those pesticides/insecticides. For example, there are many insects and pests on the shipping vessels like Nivaga II, so we need insecticides to kill them because people cannot live happily together with insects and pests.

2.5 Taiwan Project

List of chemicals stocked by the Taiwan Project.

Names	**Used/function**	**A in**	
Methyl'(butylcarbamoyl)	Kill ants.	Be ca	
Confidor insecticide	Control aphids,mealybugs,whitefly.	N	
Malathion.	Kill mosquito and other insect.	C 50 m th en co	
Match, insecticides	Control of codling moth and leaf roller on apples and pears.	M co 50	

		 ield. t e c A 5 hydrocarbon liquids.		
Fertilizers (N,P,K)	Control plant growth	4 sacks	Stocked in storage room	Fiji
Urea	Control plant growth	4 sacks	Stocked in storage room	Fiji

Chemicals stored by the Taiwan Project

2.5.1 Problem encountered.

According to the manager of the project he usually sprays his garden with water, but others showed us the pesticides and insecticides they sprayed on their garden.

.

2.5.2 Additional information

All of their pesticides/ insecticides used were imported from Taiwan. The fertilizers were brought from Fiji. They used pesticides to control few pests and insects that damaged their crops. They have malathion in their stocks but they are not using it because it is too poisonous. They do not have expired chemicals, but they are planning if they have wastes they will bury it around their premises. The Project gives off chemicals, fertilizers, urea to potential farmers who needs assistance.

2.5.3 Alternative plans

They do not have alternative plans to minimize the use of chemicals because the crops they are working on are very fragile and takes shorter time to mature.

2.6 RECOMMENDATIONS

- Legislation needs to be enforced by the Government for all pesticides/insecticides imported/donated, used and disposal.
- Need to create chemical management plans or risk assessment for each pesticide/ insecticide used.
- Banned all the pesticide/insecticide that is under the Stockholm convention.
- Record ways of using pesticides/insecticides and sites where the pesticides/insecticides are used and disposed or stocking areas.
- It is important for the concerned department(s) to control the flow of chemicals under various projects.
- Find a safe place for stocking away from people especially children and rain.

3. Polychlorinated biphenyls (PCB) Survey

3.1 INTRODUCTION.

Polychlorinated Biphenyls (PCBs) is a group of dangerous industrial chemicals, valuable for their fire resisting quantities, but an environmental hazard because of persistent toxicity. It is also any of several compounds that have various industrial applications and are poisonous environmental pollutants, which tend to accumulate in animal tissue. Since 1973 PCB use has been limited by international agreement, but due to its multitude of applications, many of which are still in use today as shown in Table 1 below.

The effects of low-level PCB exposures include liver damage, reproductive developmental effects and possibly cancer. Due to the last survey conducted in 1998 some people, especially those who have the possibility of having such chemicals, like the Tuvalu Electricity Corporation have just started to be aware of the dangers that such chemicals might have on their employees repairing and servicing their equipments containing PCBs as well as the environment.

Type of application	**Use**	
Closed applications	Electrical transformers	
	Electrical Capacitors ➢ *Power factor capacitors in electrical distribution systems* ➢ *Lighting ballast* ➢ *Starting capacitors in motors, refrigerator, heating systems, air conditioners, hair dryers etc.* ➢ *In television sets and microwave ovens.*	
Partially closed applications	Heat transfer fluids Hydraulic fluids Vacuum pumps	Switches Voltage regulators Liquid filled circuit breakers
Open applications	Lubricants o Immersion oils for microscopes (mounting media) o Brake linings o Cutting oils o Lubricating oils Surface coatings o Paints *on underside of ships o Surface treatment for textiles o Carbonless copy paper (pressure sensitive) o Flame retardants * on ceiling tiles	* on furniture walls o Dust control * dust binders o Adhesives *special adhesives * for waterproof wall coatings o Plasticizers *gasket sealers *Sealing materials in filling concrete *PVC (polyvinyl chloride plastics) *rubber seals

The objectives of the survey being carried out now are not only to the Companies or Corporations being visited by the 1998 survey but also to others that were not included. This includes:

1. The assessment of current use of PCBs in the country and to
2. Understand the likely:
   I. Quantities
   II. Equipment types
   III. Holders
   IV. Operational practices
   V. Health and safety management and
   VI. End of life treatment of PCB containing equipments and materials.

3.2 Methodology.

3.2.1 Site selection.

We selected Tuvalu Electricity Corporation, British Petroleum South West Pacific (Tuvalu Depot), Tuvalu Co-operative Society, National Fishing Corporation Tuvalu, Public Works Department and Tuvalu Maritime Training Institute because they are not included from the 1998 survey but have the possibility that some of their equipments and wastes may contain Polychlorinated Biphenyls.

Some of their equipments were just a few metres away from public living areas, refer to appendix, while others they stored and disposed their waste that might contain or have been contaminated with PCBs just a few metres away from the sea which can have access for these dangerous chemicals to be swept or spilled into the sea.

Moreover it also a way of letting these people to know the dangers that can be caused by their products, equipments and materials being imported or used within their workplaces and could endangers the environment.

3.2.2 Data collection.

Interviewing of the concerned officers made it possible for us to gather relevant information that we needed for our survey. This information includes the status of their equipments, stock and storage, and disposal routes as well as their ideas that may contribute to minimize possible PCBs contamination, improper disposal and storage.

Taking of photos of equipments, storage site and stocks in the premises also gives us evidence of the location and storage systems if they were appropriate or inappropriate with environmental conditions. These photos made it clearly visible leaks that could cause contamination, see appendix.

Questionnaires were also made though the survey and these were conducted with assistance with officers that have more experience in servicing and repairing the equipments. These are all included in the appendix.

3.3 Results

Table 2: List of Companies/Department surveyed and their PBC status.

Company	Equipment Containing PCBs	Costs Of Equipments	Location and storage	PCBs In St	
Tuvalu Electricity Corporation	Containers containing transformer insulation oils.	AUD$343.00 per drum	Power House verandah.	1,000L drun	
	Switch gears	NZ$13000.00	-	-	
	Transformers	NZ$26000.00	Substations.	All transformers Seven transformers tested, 4 po but after rete only 1 has than 500 PCB.	
Tuvalu Cooperative Society	Waste oil	-	Half drums	100L*	
	Refrigerators	$6000.00 (varies from the size of each product)	Company's warehouse.	Starting capacitors*	
British Petroleum	Waste oil (from customers).	-	Inside depot area	20,000L c of waste oil.	
Tuvalu Maritime	Oil waste collector and waste oil from engines.	-	Old T.E.C power house and in 20L plastic	About 2 containers.	

Training Institute			containers.		fire fighting demonstrations to students and seafarers.
National Fishing Corporation of Tuvalu	Waste oil from ships engines.	-	200L Drums	400L waste oil*	BPSWP.
	Capacitors from starting motors	-	-	-	Rubbish dump.

*Yet to be confirmed- to be tested for PCB.

3.4 Equipments.

For the time being only Tuvalu Electricity Corporation has the possibility to be having PCBs in their equipments as well as their stock, this is confirmed by one of the Waste Management Project officers that they have already sent one of TEC equipment containing the exceeded amount of PCB to be destroyed in Australia. Other companies and corporations were to be confirmed by samples being taken from waste oils and other relevant goods that might contain these dangerous chemicals.

3.5 Contaminated Sites.

So far we have not come across any site to be PCB positive but have some tips that some of the sub-stations owned by TEC have been service or undergo repairs but oil spills were seen during these services, these spilled on the soil as they were not mounted on a concrete foundation. Testing can only be a solution to monitor these.

3.6 Disposal Routes.

Tuvalu Electricity Co-operative: Transformer Insulation Oil containers were dumped at the public dump site, Northern end of Funafuti.
- Waste oil from generators was disposed by BPSWP[22].

Tuvalu Maritime Training Institute: Waste oil and fuel were poured over rubbish dump and burned together with various wastes.

National Fishing Corporative of Tuvalu: waste oils taken to BPSWP.

British Petroleum South West Pacific: collects all waste oils from customers and kept them at their depot awaiting shipment to Vuda, Fiji.

3.7 Alternative Plans.

The Companies/Departments visited have made plans that will minimize the adverse effects that these chemicals may have on the environment these includes:
British Petroleum (Tuvalu Depot) have already started its chemicals awareness program which enables the customers on safety handling, storage and collecting of waste, especially waste oil to their depot then shipped it to Fiji.
The Tuvalu Electricity Corporation has also been aware since the 1998 survey and is willing to discard the use of PCB containing transformers in the future when its financial status is stable.

3.8 Conclusion.

Based on our finding we can state clearly that there were possible equipments within the country that really contained PCBs but we believed that they are within the amount permitted in Tuvalu. Therefore the following were identified that there were:

I. No chemical management

[22] British Petroleum South West Pacific

II. No disposal plans
III. No monitoring of PCB
IV. No proper storage systems
V. No public awareness programs

In comparison with the 1998 survey we can see clearly that there are more Companies and Corporations being visited and we can assume that there can be more PCBs that can be found but we hoped that they do not exceed 500ppm.

3.9 Recommendations.

From our own observations we therefore forward these recommendations in order to minimize and control the possibilities that may be encountered and cause contamination:

For Tuvalu Electricity Corporation all of their substations containing harmful chemicals should be sheltered from the sun and rain making it possible to reduce heat that might cause gaskets ruptures thus oil leaks may occur. Foundations should be made of concrete in order to clean up any oils/ chemical leakage during servicing before reaching the ground.

Tuvalu Maritime Training Institute should cease using oils and fuel wastes as an igniter or for disposing these chemicals, as their rubbish dump is only about five metres from the lagoon and could have the possibility of these chemicals to be swept into the sea during high tide. The plastic waste oil collector should be dug so that the lid be visible and be opened at any time for level inspection and allowed waste oil and fuel be bailed out into waste storage drums, kept as they are now and transferred to the BPSWP depot for disposal.

Tuvalu Co-operative Society should store their waste oils away from the sea, lagoon side as these waste oils could be washed or leak into the and sheltered them under a roof this will prevent rain from overflowing their storage bins which could made these waste oils to flow into the sea.

Regulations on the imports of such dangerous chemicals that would lead to cause them harmful before and after use should be strengthened. The holders of such chemicals should be aware not only to maintain their equipments but also to know the devastation impact that may result to the public health problems.

Raise awareness program for workers to exercise the caution when handling waste oil in order to minimize contamination.

Conduct fieldtrips to verify the presence of PCBs in Tuvalu and to trace their accumulation in the environment.

3.10 Appendix 1

Leaking transformer Sub-station #2
(opposite Lucky set club)

Transformer Insulation oil (power house)

Sub-station #5 at Fisheries, Teone. (concrete shelter).

Sub-station #5 at Fisheries, Teone. (No concrete foundation).

Waste oil storage at Tuvalu Maritime Training Institute. (Old

valu Maritime Training Institute. (Dug out

4. REPORT ON THE SURVEY OF UNINTENTIONAL RELEASED OF POPs IN TUVALU

4.1 INTRODUCTION

"The Stockholm Convention is a global treaty to protect human health and the environment from persistent organic pollutants (POPs). POPs are chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of living organisms and are toxic to humans and wildlife. POPs circulate globally and can cause damage wherever they travel (http://www.pops.int/)"

In fact, the focus is on Polychlorinated dibenzo-p-dioxins (PCDD) and Polychlorinated dibenzofurans (PCDF) which are known to be formed as unintentional by – products in certain processes and activities, such as;

- Waste incinerators, including co-incinerators of municipal, hazardous or medical waste or of sewage sludge;

- Open burning of waste, including burning of landfill sites;
- Residential combustion sources; and
- Motor vehicles, particularly those burning leaded gasoline;

to name a few (http://www.pops.int/).The above list are some of the processes and activities that we, humans practice not knowing that we are releasing PCDD and PCDF into the atmosphere.

Dioxins are found throughout the world in practically all media, including air, soil, water, sediment, and food, especially dairy products, meat, fish and shellfish. The highest levels of these compounds are found in some soils, sediments and animals. Very low levels are found in water and air (http://www.who.int).

Therefore, short-term exposure of human to high levels of dioxins may result in skin lesions, such as chloracne and patchy darkening of the skin, and altered liver function. Long-term exposure is linked to impairment of the immune system, the developing nervous system, the endocrine system and reproductive functions (http://www.who.int).

From the above negative impacts to our health and environment, a thorough survey was conducted with the aim to set up a baseline information/database on the unintentionally released of dioxins and furans in Tuvalu taking into account all relevant stakeholders.

4.2 METHODOLOGY

A survey questionnaire (Appendix 1) was developed and was geared to those departments/organizations/sites initially thought might practice unintentional processes and activities that releases dioxins and furans. These departments/organizations/sites include Princess Margaret Hospital (all departments), Fetuvalu Secondary School, Tuvalu Electricity Co-operation, Public Works Division, Agriculture (Quarantine Wastes & Plane Wastes), Tuvalu Cooperative Society, Fusi Funafuti and Supermarkets, Samuelu Builders Hardware, Private Mechanic Workshops (Homasi and Michael), Taake Air Condition Maintenance, Waste Management Project, Vaiaku Lagi Hotel, British Petroleum, Amatuku, NaFICOT, Bank, and some residents.

The period of survey provided was only three weeks; this reflects the need to urgently establish baseline information on the practice of unintentional processes and activities that releases dioxins and furans.

In addition to the survey questionnaire, an interview was also carried out to follow up on the questionnaires given to key stakeholders. The interview was geared mainly for residential survey. Both the survey questionnaires and the interview conducted examined the various organizations of their views with regard to the practice of certain processes and activities, such as those listed in Annex C of the Stockholm Convention.

The interviewer's views were of vital importance to the development of the National Implementation Plan (NIP) for Tuvalu. This ensures the reduction and minimization of dioxins and furans unintentionally released to the atmosphere.

4.3 RESULTS

The results of the survey were compiled and are reported in a tabular form (Table 1).

DEPARTMENT	TYPE OF WASTE	DISPOSAL **ACTION**				**CONTAMIN ROUTES**		
		Burned	**Landfill**	**Buried**	**Re-cycle**	**Air**	**Land**	

Agriculture	Plastic (cup, folk, knife), paper, timber.							**Waste Management Project**		Nappies, plastic, film, bags, paper, tins, plastic bottle, glass							
Naficot	Paper, timber, forklift, engine part, rod							**Hotel**		Paper, glass, plastic, rod, timber, tins							
National Bank of Tuvalu	Paper, carbon paper							**Public Works Department**		Tire, engine part, trucks, timber, air corn, fans, washing machines, video, copper, wire							
Fetuvalu High School	Paper, plastic, tins																
Tuvalu Electricity corporation	Plastic bottles, paper, carbon paper, cartridges, wire, engine part, rod, waste oil							**Household**		Plastic, paper, timber, plastic bottle, nappies broken glass,,							
Tuvalu Cooperative Society	Paper, carbon paper, timber, cardboard, tins							**Princess Margaret Hospital**		Paper, gloves, plasters, syringe, needles, expire chemicals, plastics, cans,							
Fusi Store	Cardboard, tire, paper, plastic																
Samuelu Builders Hardware	Paper, timber, rod, truck, plastic							**National Bank of Tuvalu**		Paper, Broken Chairs, Desk top, Computer,							
Michael mechanical Workshop	Engine part, timber, motorcycles, tire, wire																
Taake	Air-con part, copper																

Homasi Mechanical Workshop	Motorcycles ; wire, tires, engine part, cars, rusty rod, waste oil					
British Petroleum	Paper, drums, waste oil					
Tuvalu Maritime Training Institute	Papers, engine part, fiberglass boat, plastic, cans, rusty rod, waste oil					

4.4 Princess Margaret Hospital (PMH)

The Princesses Margaret Hospital was one of the major stakeholders that the survey covered. Listed below are areas covered by the survey within the PMH.

4.4.1 PMH Cleaners

Cleaners at the PMH were being interviewed regarding the collection and disposing of rubbish at the PMH. They said that their task was to collect all rubbish and before disposing them, they sought them out. They separate cans, plastics and glass from rubbish and put them in a rubbish bin for the Waste Management work force to be disposed.

However, the sort of rubbish they disposed to the incinerator was mainly medical wastes such as needles, scalpels, forceps, and plastic gloves to name a few. These medical wastes are from the General Ward and Maternity Ward. Hence, the burning of the mentioned rubbish using the incinerator will be carried out by the Waste Management people but not themselves (cleaners).

4.4.2 LAB

In the PMH lab there are expired chemicals and waste chemicals from machines found to be stored there. These chemicals are waiting to be burned in the incinerator together with unused needles.

It was also mentioned by the interviewee that previously (i.e., from the old hospital lab) they use to dispose chemicals to the surroundings if there is a mistake in the mixing of chemicals. Thus, no proper disposal techniques used and chemicals are being disposed or poured to the surroundings.

4.4.3 X-RAY

Wastes

All wastes from the x-ray room were disposed to the landfill sites at the end point of the capital (i.e, the northern end side). These wastes include papers, film envelope, and empty bottles (usually used to store chemicals).

Furthermore, the interviewee said that previously, they used to burn x-ray films at the northern end of the capital but now x-ray films were being given to women who need them to make patterns for their pillow cases.

Chemicals

There were waste chemicals namely fixer and developer drained from x-ray machines. These chemicals were drained to another machine and also to 4 liter bottles. If these bottles were full, these chemicals will then be poured again to the machine and so on. So the process is repeated.

4.4.4 Pharmacy

There are many expired chemicals stocked by the pharmacy department. They plan to incinerate some of their chemicals, but most of their expired stocks are stored in and around the hospital. Most of these expired chemicals were donated by international organizations and also governments. The list of some of these expired chemicals is given in Appendix 2. Some of these chemicals do not have proper labels.

4.5 Fetuvalu Secondary School (FSS)

Rubbish in the school were being collected and placed into available rubbish bins and the Waste Management working people will disposed them to landfill sites. Sometimes the rubbish bins were full up before the Waste Management people arrived to dispose them. Therefore they will act to burn rubbish instead of putting them into full up bins. Only papers were burned at the eastern side of the campus.

However, there are chemicals stored in the school laboratory and are yet to be used. No expired chemicals found to be stored in the lab.

4.6 Tuvalu Electricity Cooperation (TEC)

The TEC department also practices burning of wastes as mentioned by the cleaner. The burning process was carried out in a drum and if the drum is full it will dispose to the landfill sites at the northern end of the capital.

According to one of the TEC staff, waste oils from generators were being stored in tanks which are situated at the eastern side of the TEC vicinity. The amount of waste oils stored at the TEC is about 10, 000 liters. These waste oils were disposed by the British Petroleum people. The name of the waste oil is ***C6 Global***.

4.7 Public Works Division (PWD)

The department does not practice burning of rubbish, but all their rubbish are disposed to the landfill sites at the northern end of the capital. Meantime, there are nine cars ready to be disposed to the landfill sites at the northern end of the island.

However, there are bitumen drums found at the PWD vicinity (beside the Mechanical Workshop) and these drums are being worn out thus spilling all the bitumen onto the land. These drums of bitumen are left over from the construction of the plane field.

4.8 Agriculture

This department also practices burning of wastes. The department is responsible for quarantine wastes and plane wastes and these wastes were burned in an incinerator situated near the Women Prison. Beside quarantine and plane wastes, the department also burned waste fruits from all stores and supermarkets.

4.9 Tuvalu Cooperative Society (TCS)

TCS also practice burning wastes but the worse thing is that they use open burning and they burned everything including steel rods, cans, plastics, papers, cardboards, timber etc. The burning site was just beside the sea and it was mentioned by the TCS staff that during high tides all the leftover rubbish and ashes were all being swept into the lagoon.

4.10 Funafuti Fusi

The Funafuti fusi does not practice burning wastes. However, all their rubbish was disposed to landfill sites at the northern end of the island. Rubbish disposed includes cardboards, papers, plastics, bottles etc.

In addition to the above, the Funafuti fusi staff also mentioned that all expired cans are opened and disposed to the sea and the cans are taken to the landfill sites at the northern end of the island.

4.11 Supermarkets

The supermarket staff refused to talk about their wastes collection and disposal. Therefore no information collected from the supermarket regarding the collection and disposing of wastes.

4.12 Samuelu Builders Hardware (SBH)

SBH also practices burning wastes. Burning wastes includes papers and leftover ply woods. It was also mentioned by the Manager Laloniu Samuelu that all left over timbers were stored to be used as fire woods.

4.13 Private Mechanical Workshops (PMW)

The two private mechanical workshops do not practice burning wastes. All their wastes were disposed to landfill sites at the northern end of the island while waste oils were stored for cleaning tools as well as to oil motorcycle's chain.

4.14 Taake Air Condition Maintenance

This company does not practice burning wastes. However, all its wastes were disposed to landfill sites situated at the northern end of the island.

Copper metals on the other hand will be shipped to Fiji to be sold.

4.15 Waste Management Project

The name reflects the importance of this department in managing wastes on the capital. The project collects all wastes and separates them accordingly. There are also wastes that need not be burned nor disposed such as batteries, expired chemicals from PMH, waste oils and worn out drums. These wastes are being kept and stored in the hanger.

However, this project has its own incinerator situated near the Princess Margaret Hospital.

4.16 Vaiaku Lagi Hotel (VLH)

Previously, the VLH practiced burning wastes. Papers are the only wastes they burned. However, there are complaints coming from people when the VLH burned their wastes.

Recently, the VLH as mentioned by one of the staff will do away with burning wastes, thus all their wastes are disposed to landfill sites at the northern end of the island.

4.17 British Petroleum (BP)

This company does not practice burning wastes; hence the company carefully managed all wastes oils. Their existing policy is that waste oils will be sent to Fiji to be burned and all worn out drums were disposed to the landfill sites at the northern end of the island.

4.18 Tuvalu Maritime Training Institute (TMTI)

This institute used an incinerator and also practice open burning. The incinerator was used to burn medical wastes from the clinic while all other rubbish will be burned in the open. These burning places were situated near the lagoon where during high tides the tide can reach these areas sweeping all leftover ashes into the lagoon.

Furthermore, all waste oils were stored in a plastic tank of 60 gallons capacity. If this tank is full then waste oils will be drained into 20 liters cans and drums. These drums were kept and stored to be used in burning the rubbish dump.

In addition, there are fiber glass boats, bulldozer, batteries, and cement mixers ready to be disposed but the major problem is that there are no place for the mentioned wastes to be disposed.

4.19NaFICOT

The department practiced burning wastes, only papers. All solid wastes were disposed to landfill sites situated at the northern end of the island. However, there are waste oils currently stored by the department but not that many. There are also heavy machineries such bulldozers found in the vicinity that needs to be disposed off but the problem is the place for disposal.

4.20Bank

The Bank has its own incinerator situated near the main road. One of the staff mentioned that only papers are burned but what the survey had found was that bottles and cans were also visible from the incinerator. The staff commented that may be people walking past may throw their bottles and cans into the incinerator.

However, as the incinerator fill up to the brim, the ashes will then be shoveled just beside the incinerator.

There are also obsolete computers and printers stored in a container ready to be disposed to landfill sites at the northern end of the island.

4.21Households

There are 15 households covered in the survey and they have a common answer that they are not practicing burning wastes. Their wastes were being collected and stored in rubbish bins for the Waste Management people to dispose to landfill sites.

4.22 CONCLUSION & RECOMMENDATIONS

It seems that quite few number of departments practiced burning wastes using incinerators and open burning. Below are some of the recommendation we think might contribute to the minimization and reduction of unintentionally released of dioxins and furans.

1. Developing countries such as Tuvalu must develop appropriate legislations to fulfill its obligations under the Stockholm Convention.

2. Bank Incinerator needs to relocate because its current location pose significant threats to people as they walk pass.

3. Wastes need to be separated before burning. For example plastics, timbers and wastes that possibly released dioxins and furans needs to be separated so that the released of furans and dioxins will be minimized.

4. It is very important and essential to create public awareness programs regarding the effects of burning wastes such as plastics, carbon papers and timbers to human health and environment.

4. 23 References:

http://www.pops.int

http://www.who.int.
-
-

Outer island POPs and hazardous wastes survey
-

References

1. Asian Development Bank, 2002, *Tuvalu- 2002 Economic and Public Sector Review*, Manila.

2. Government of Tuvalu, 1983, *Tuvalu A History*, Institute of Pacific Studies and Extension Services, University of the South Pacific and Ministry of Social Services.

3. _____, 2006, *Tuvalu National Budget 2006*, Funafuti.

4. _____, *TE KAKEEGA II- National Strategy for Sustainable Development 2005-2015*, Economic Research and Policy Division, Ministry of Finance, Economic Planning and Industries, Funafuti.

5. Graham, Bruce., June 2005, *Draft National Plan for Implementation of the Stockholm Convention on Persistent Organic Pollutants in Fiji Islands*, Suva.

6. Graham Environmental Consulting Ltd, June 2005, *Implementation of the Stockholm Convention in Pacific Island Countries- Addressing Releases of Unintentional POPs;* A draft report to the New Zealand Ministry for the Environment.

7. Lane, J. 1994, *Tuvalu: State of the Environment Report*, South Pacific Regional Environment Programme, Apia, Western Samoa.

8. Tauetia, Melton., Saosaoa, Soseala., *Report on the revisit to Vaitupu (20th -23rd March 2006)*, POPs Project Enabling Activity, Department of the Environment.

9. Niuatui, Lomiata., 2005, *Review of the Administrative, Institutional and Technical Infrastructure*, POPs Project Enabling Activity, Department of the Environment.

10. Niuatui, Lomiata., and Ulika, Kiatoa 2005, *Tuvalu National Chemical Profile*, POPs Project Enabling Activity, Department of the Environment.

11. Pulea, Mere,. Farrier, David., 1994, *Environmental Legislation Review*, SPREP, Apia, Western Samoa.

12. UNEP Chemicals, 2002. *Regionally Based Assessment of Persistent Toxic Substances*, Pacific Islands Regional Report, Geneva.

13. Viliamu, Iese, July 2006, *Dioxins and Furans Inventory in Tuvalu*, Department of the Environment.

14. _____, July 2006, *PCB Preliminary Inventory in Tuvalu*, Department of the Environment.

15. _____, July 2006, *Socio economic analysis of PCBs in Tuvalu: A preliminary Analysis*, Department of the Environment.

16. _____, July 2006, *Pesticides/insecticides preliminary inventory*, Department of the Environment.

17. _____, July 2006, *Unintentional POPs Release Preliminary Inventory*, Department of the Environment.

18. Wendt, Neva., and others, 1997, *Tuvalu: National Environmental Management Strategy*, South Pacific Regional Environment Programme, Apia, Western Samoa.